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A CONTRIBUTION TO BRAIN SURGERY.

Six Severe Operations Entailing Prolonged Manipulation of the Encephalon.

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AND

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Case I. *Terminal dementia of alleged traumatic origin. Trephining and exploration of brain, with great improvement, lasting nine months; relapse. Second operation; marked and increasing improvement.*—May M., æt. twenty-eight, American by birth and parentage, and of good education; of rather slight physique but always in fair health. There is no family taint of insanity or personal history of neurotic tendency or mental instability. In April, 1884, she became deranged, the mental disability continuously increasing. In July of the same year she was admitted to the Illinois Hospital for the Insane, at Elgin, in the service of Dr. Church, and entered on the records as a case of subacute mania. The father, a very well educated and intelligent man, subsequently stated that the only assignable cause for his daughter's alienation was a knock she had given her head in coming up a cellar stairway. She was stunned by the blow and delirium lasting a few hours resulted. The details of this accident, coming through third parties, are not entirely reliable, and the portion of the head struck could only be inferred. A few days afterward a lady whom she was visiting thought her "out of her head." Gradually she grew worse, and finally was so unmanageable, though never violent, as to require hospital treatment and restraint. During her residence in the asylum she never mani-

fested any symptoms of head injury or indications of focal trouble in the cortex, but her mania ran an ordinary course to a chronic stage and complete dementia. She became filthy in her habits, at times destructive of clothing, at times noisy, but for the most part sat idly, silently, stupidly wherever placed, indifferent alike to spoken directions and the demands of nature. In this condition she was discharged from the hospital and removed to her home as incurable, January 1, 1889.

The father had elaborated and tenaciously clung to the idea that traumatism was the cause of his daughter's insanity. He gave the case his constant study, made casts of her head, and urged that surgical measures be taken because a slight flattening of the skull over the right coronal suture led him to suspect fracture of the inner table, or compression. While at the asylum several consultations were held to determine the advisability of the operative interference he desired, without confirming his views and equally without shaking his opinion.

February 23, 1889. Admitted to St. Elizabeth's Hospital under the care of Dr. Frank. It was noted that she walked with a shuffling gait and dejected air, that she was constantly muttering and had a vacant look, wandering aimlessly about, picking and tearing at her clothing, and that she was heedless of the calls of nature, often soiling herself. It was impossible to attract her attention for a moment. She had to be fed by the nurse, and this was only accomplished with much persistence and difficulty. Examination of chest, abdominal and pelvic organs detected nothing wrong. There was no paralysis, or abnormalities of general sensation, or the reflexes. Dr. W. Franklin Coleman, ophthalmologist to the hospital, examined her eyes and made the following report:

"Reads most letters of No. XX. Snellen at twenty feet with either eye. She will not name some of the letters of No. XX., probably on account of her mental condition. With the ophthalmoscope refraction is emmetropic. The fundus of each eye looks normal in every respect. An attempt to test the ocular muscles with prisms failed to elicit any answers. The excursions of the eyes and the associated movements are apparently normal."

When the head was shaven there was some lack of symmetry, the right parietal surface anteriorly being lower than the left. There was no abrupt depression or traces of injury upon the scalp, and as a brother exhibited exactly the same conformation, it was considered congenital and it was decided not to operate. The father, however, persisted that an operation be done and was anxious to assume all risk, feeling that the girl might better be dead than in the condition she then presented. He asserted his determination to take her from one surgeon to another until some one was found to undertake the surgical measures he felt sure would relieve her. At this time she was seen by Dr. Brower, Professor of Mental Diseases in Rush Medical College, etc., who gave the following written opinion, January 26, 1889:

"After consideration of your daughter's case I have reached the following conclusions:

"1. That the insanity was caused by the injury, because of the absence of any other possible cause and the immediate connection between the two.

"2. That the injury need not have produced fracture or depression of the skull to have resulted in insanity.

"3. That the depression of the skull of your daughter may be congenital,

but its situation with reference to the injury makes it possible that it may have been produced by it.

"4. This probability justifies exploration of the surface of the skull, and possibly trephining.

"5. That it is not unreasonable that even if the insanity is due to the injury the long duration of the disease may make the result of the operation negative.

"6. That the danger of the operation is so slight that it should not weigh against the possible benefit."

In consequence of this opinion, in which Dr. M. H. Luken, Attending Physician to St. Elizabeth's Hospital, entirely concurred, and the father's determination, it was decided to operate, and if nothing were found in the skull-cap or meninges to explore the brain itself.

April 2, 1889. The head was again shaved and the patient given a sublimate bath, after which the head was thoroughly scrubbed, cleansed with sublimate solution and enveloped in an antiseptic dressing to await operation, which was done the next day (April 3d) by Dr. Frank, in the presence of Drs. Holmes, Newman, and Hall, with the assistance of the hospital staff and Dr. Luken. Chloroform was used. The head was once more thoroughly washed with sublimate solution and the part of the skull to be attacked—namely, the slight depression in the right anterior parietal region—marked out upon the scalp. With a small drill the scalp was transfixed and the cranium scored that the proper position might be readily found after the scalp should be lifted. The field of operation was then embraced in a horseshoe-shaped line of interlocking silk stitches, which, being tightened and tied, completely controlled hemorrhage. An incision was made within the row of stitches, forming a flap with its base toward the brow, its convexity posteriorly and including the periosteum. The flap was rapidly separated from the cranium and bleeding points on its margin were secured by hæmostatic spring clip forceps, especially devised by Dr. Frank, having a wide transverse bite to prevent crushing and at the same time to include a larger portion of the flap's edge than could be controlled by an ordinary instrument.

FIG. 1.

Spring-clip forceps for controlling hemorrhage from margin of scalp flap. Two-thirds actual size.

By means of a suture to the brow the flap was kept out of the way and four buttons of bone, three-quarters of an inch in diameter, were removed by an ordinary conical trephine. These were immediately placed in a bowl of warm sterilized water to which an assistant gave scrupulous attention, maintaining the temperature as nearly as possible at 99° F. With the rongeur the cranial opening was freed from its sharp points and bridges of bone and the margins properly smoothed, all fragments and chips being placed with the buttons in the warm water. No

indications of traumatism were presented by the portions of bone removed or by the exposed dura, which showed the normal cerebral pulsations and did not bulge into the opening. The finger, swept widely around between the dura and the skull in all directions, encountered only normal anatomical points.

Two branches of the middle meningeal artery were ligated by passing an armed needle under them, and the dura was opened at a distance of one-quarter of an inch from the bony margin, care being exercised to interfere as little as might be with its blood supply, in order to preserve its vitality—upon which, of course, depend its primary union and the prevention of cerebral hernia. With this in view the base of the flap was formed toward the body, from which direction it receives its blood. When turned down it was protected from abrasion by instruments or the sharp edge of bone by a few folds of warm gauze, and secured in a favorable position by a suture to the ear.

Immediately upon opening the dura there was a gush of cerebro-spinal fluid, probably four ounces at once escaping, and the arachnoid and pia looked œdematous and jelly-like, all the meshes being filled with the same colorless fluid. The under surface of the dura was palpated in all directions as far as the length of the finger permitted, except across the median plane, where it was stopped by the falx. In this way the sharp margin of the lesser wing of the sphenoid and the ridge of the petrous portion of the temporal were readily made out. The œdematous arachnoid presented high vascularity and threatened serious hemorrhage if interfered with. In attempting to take up the engorged vessels the tissues tore through, but surprisingly slight bleeding ensued. Consequently, with dissecting forceps in each hand the turgid vascular membranes were freely stripped from the convolutions over the entire field of operation and the flow of blood was readily controlled by a little pressure. With fingers and a spoon handle the sulci were carefully opened and examined but nothing abnormal could be found. Finally, a minute portion of the brain tissue was removed for microscopical examination. The cortical region exposed embraced the ascending convolutions in the area for the arm centres and the middle third of Rolando's fissure. The irrigator was freely employed, charged with sterilized water, at all stages of the work.

All bleeding parts having been controlled the dura was replaced and secured by catgut sutures in accurate position, a drainage-tube full of iodoform wicking being passed under one corner and lying on the surface of the brain. The buttons of bone and all small chips and fragments were replaced and iodoform wicking packed in, around, and between them for the purpose of drainage and to assist in maintaining them in position, the strands coming out with the brain drainage at the most dependent portion of the scalp wound, which was closed with numerous suture points. The interlocking stitches were then removed, the head properly cleansed, and completely enveloped in a very ample antiseptic gauze dressing.

The patient rallied nicely from the anæsthetic, passed a quiet night, and no untoward symptoms were developed at any time. The temperature never reached 100° F.

No convulsions, vomiting, or stupor appeared, but a gradual gain in mental power, memory, habits of cleanliness, and deportment was noted from the first.

The condensed daily record follows:

April 4. Asked for a vessel, a thing she had not known enough to do for years, and is brighter mentally.

6*th*. The drainage-tube was removed. There has been a considerable discharge of cerebro-spinal fluid on the dressings.

9*th*. Motor power in left hand diminishing, probably from interference with the arm-centre at the time of operation. Began to menstruate the first time in many months.

10*th*. Not so bright mentally, and seems in danger of relapse into her former demented condition.

11*th*. Head dressed. Is up and around room eight days after operation.

13*th*. No control of muscles of left arm. Answers questions rationally and readily. Received a letter from her father which she enjoyed and read without a mistake. Commenced a reply this afternoon, but after a few words lost coherence.

15*th*. Left arm blue and cold, but sensation is not appreciably impaired.

16*th*. Mind growing stronger, and she is cleanly in her habits.

20*th*. Visited by her father, who saw much improvement in her condition.

22*d*. No reaction to faradism in left forearm and hand. The replaced bone buttons seem firmly united.

26*th*. Paralysis diminishing. There is slight voluntary movement in flexors.

27*th*. Faradic and voluntary contractions in muscles of left arm and forearm increasing.

28*th*. Color of hand normal, but still colder than its fellow. Patient is quiet in deportment and answers all questions rationally and correctly.

May 1. Paralysis completely gone. Wound in scalp healed soundly by first intention, and there is firm union between the buttons of bone and the cranium—the conformation of the skull being much what it was before operating. To-day had eyes examined by Dr. W. Franklin Coleman, who reports as follows:

"The ocular muscles are examined especially as a test of the patient's present intelligence. During the previous examination she kept up a constant muttering and could not be induced to hold her head quiet, which made the examination of the fundus somewhat difficult. Her manner is now quiet and attentive, still with an air of sadness. She answers promptly questions concerning her residence, age, etc., though she states she is seventeen. Upon testing her ocular muscles by prisms and a lamp at twenty feet, her answers are now remarkably prompt and consistent, even during tests for adduction, abduction, hyperphoria, etc., which were many times repeated. As an evidence of very intelligent observation, I cite the report of one test. Diplopia is produced with a prism base up before the left eye, and then the base is inclined toward the median line. She readily and correctly described the lower image belonging to the left eye as 'horizontal,' 'out of the vertical,' and 'to the left side of the upper.'

"At twenty feet adduction—right eye, 5°; left eye, 3°. Abduction, right eye, 5°; left eye, 6°. No hyperphoria. I have examined the ocular muscles of many patients whose mental capacity was unques-

tioned, who did not give more ready and intelligent answers than the above patient. The transformation in the mental action of the patient in so short a time after operation is the most gratifying and phenomenal instance I have seen."

4*th*. Patient was discharged and returned to her home in the country.

The following account of her conduct and condition after leaving the hospital is furnished by her father, who watched her carefully and intelligently, and Fig. 2 is from a photograph taken two months after the operation.

February 21, 1890. "On arriving home my daughter's friends observed that she was weak in body. Her mental health presented a great change. As near as we could determine she was no longer insane.

FIG. 2.

From a photograph taken two months after the first operation.

The utter disregard of the calls of nature, which had characterized her conduct for nearly five previous years, had entirely changed, and this improvement has continued from that time, with one minor exception, until the 10th of this month. Her mental powers were very feeble. At first she could not remember her own mother's name, and she had the idea that she had been at the asylum only four months instead of four and a half years. A week or so after her return she gave me correctly the names of the Presidents. Her memory of former years returned so that it was fully as good as that of the other children. Through the summer and early autumn she would help the children with difficult problems in arithmetic, and much of her schooling returned to her. She gained in bodily strength, doing a share of the housework, mending her own garments, attending to her room, and once in a while cooking a meal for the family. Without great care on our

part she would eat too heartily, which would be followed by spitting up of food. This habit was entirely overcome, and has not troubled her for two months past.

"Some time in August she had a very light fit, my wife thinking at the time that she was only choking a little. About four weeks later she had another, somewhat more severe, and then at intervals of about a month three more quite severe ones, losing consciousness, foaming at the mouth, with thumbs of one or both hands turned upon the palm. Subsequently, at the menstrual periods she had lighter fits. The menses have been regular, sufficient in quantity, and of proper color. Following the fits for two or three days she would seem more than usually childish and simple. We began to fear her insanity was to return, and these fears were realized about the 1st of this month, untidiness appearing. She seems in better physical health than a year ago, but the character of her insanity is quite the same as of old."

February 27, 1890. The patient was readmitted to the St. Elizabeth's Hospital in a comparatively fair physical condition, but mentally she was nearly as bad as before the operation, yet with more activity and presenting moments of good behavior and of industry. It was impossible to fix her attention except momentarily. She would wander aimlessly about and was very disorderly, untidy, and regardless of all propriety.

March 17. She was shown before the Chicago Medical Society and another operation in the same region was advised by Dr. Dewey, Superintendent of the Illinois Eastern Hospital for the Insane, at Kankakee, and by Drs. Brower, Luken, and Church, of Chicago, to determine the condition of the skull at that point and that of the underlying parts. The convulsions dictated the election of this site, and with the improvement formerly obtained, and possibly now to be expected, justified renewal surgical interference.

Second Operation.—*March* 24, 1890. Having been prepared for the operation as before, Dr. Frank operated in the presence of Drs. Steele and Church, and with the assistance of Drs. Luken, Lawson, Beard, and Shuman. Chloroform was employed.

A line of interlocking stitches was placed about one-half inch outside the horseshoe-shaped cicatricial line of the former incision. By alternating black and white silk they were readily selected, and, when tied, completely controlled the circulation. An incision, eleven inches long, was made between the interlocking stitches and the cicatrix, embracing the latter and conforming to it, and a flap including the pericranium was rapidly turned up. At the site of the former trephining adhesions existed, and vascular fibrous processes, extending in some places between the bones, and through the central trephine-pin openings in the buttons. These had solidly, and for the most part by bony process, united to the skull forming a firm protection to the brain. The numerous small fragments of bone, chips, etc., had all been absorbed with the exception of three pieces, about the size of barley corns, which were burnished and also rapidly being absorbed, evidently only playing the part of aseptic foreign bodies, and located in the quadrangular space bounded by the four buttons. They are shown in Fig. 3 below the larger portion of bone.

By means of a Hey's saw, an area one and three-quarters by two inches was marked out, embracing the former skull opening, and, with

the same instrument, freed from the surrounding bone. In order to lift it out it was necessary to chisel away one corner, when with an elevator it was removed almost in one piece. It is accurately represented in Fig. 3. Upon the surface of the normally pulsating dura the outline of the buttons and the interstices was clearly marked by fibrous scar tissue, which was neatly dissected off before proceeding.

FIG. 3.

Two-thirds actual size. Section of skull removed at second operation, showing union of trephine buttons and below the three small fragments found in the central space which were undergoing absorption. On the margin of the left lower button another small chip is firmly united. The union between the buttons and the cranial margin is apparently bony.

The dura was next opened and cared for with the precautions formerly employed and above described, displaying the turgid, dark-red convolutions, not adherent to the dural cicatrix or apparently injured by former manipulation. A tolerably strong faradic current was applied to various portions of the uncovered brain through two pointed and sterilized electrodes, but produced no peripheral movements whatever. This suggests the probability that the restoration of motility in the left hand after the paresis following the first operation was brought about by the vicarious action of the left brain arm-centres. As before, the inside of the skull and dura mater and the surface of the convolutions was explored with the finger as far as could be reached in all directions without encountering adhesions or anything abnormal. The brain now seemed to fill the cranium properly, and there was no excess of fluid. The wound was closed in the same manner as after the first operation, except that the bone was not replaced.

Referring, again, to the valuable specimen thus obtained (Fig. 3), it teaches the old lesson that close apposition is desirable for bony union, and that, other things being equal, a large section of bone stands a better chance of surviving and being again united to the cranium than smaller and loosely applied fragments. It would probably be well to fix the portions of bone replaced by pins of bone or ivory, or by nailing. Possibly when a saw is used, by bevelling the cut proper apposition may be secured.

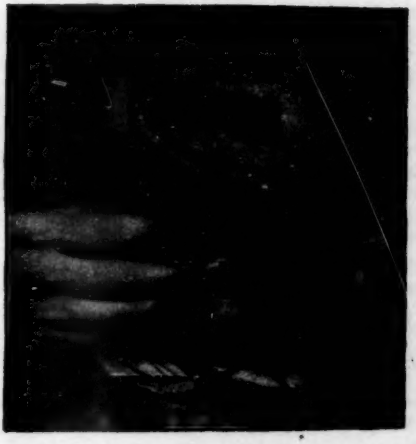
The patient rallied promptly from the chloroform and presented no indications of shock or paralysis. Convalescence from the operation was unmarked by any notable physical or surgical features. On the 28th there was an evening temperature of 101° F., but it fell the next day and remained thereafter within a small fraction of the normal point. The head was at first dressed daily and later at longer intervals. The drainage was gradually lessened and the wound united by first intention, no pus being seen.

April 3. She sat up and wrote a few words to her father quite coherently. This is the ninth day after the operation.

5*th*. She was up and around, her mental condition showing improvement.

On the 9th of April she manifested, when questioned by Dr. Church, a considerable degree of memory, intelligence, and appreciation of her condition and surroundings. She showed natural emotion when told of a slight illness which prevented her father's promised visit and read a short letter from him without difficulty and with appreciation. She was anxious to return to her home. She made all her wants known and waited upon herself intelligently, going to the closet as necessary, and presented a great contrast to the condition which had been manifest before the operation.

FIG. 4.



From a photograph taken twenty-three days after the second operation, showing the lines of both incisions and the drainage openings of the latter with the central depression marking the opening in the skull.

16*th*. Fig. 4 shows the condition of the scalp and skull upon this date, a slight depression appearing at the cranial opening which showed the pulsations of the brain.

19*th*. The father writes the following:

"I have this day visited my daughter May. She at once recognized me, kissed me, inquired about my recent illness, was affected to tears,

talked quite rationally, asked after particular individuals at home, said she wanted to go home and would like to go at once. I think, making allowance for the small opportunity of judging which I have had, that she now presents a more hopeful and better condition than at a corresponding interval after the first operation."

24*th*. Is still improving and can now be trusted to do little tasks and to run errands about the hospital. At times she mutters a little, but expresses herself as feeling very well, without pain or discomfort. She is very neat and orderly. What the ultimate result of this operation will be can only be surmised, but the present improvement is very gratifying to all concerned.

Case II. *Jacksonian epilepsy. Trephining and removal of branching sarcoma; improvement of all symptoms: relapse from probable recurrence of neoplasm.*—Peter H., æt. thirty-nine; a married German carpenter with four healthy children and no family history of neuroses or personal record of neurotic tendency. He had always been in good health and strength, though exceedingly phlegmatic and sluggish in speech, gait, and mental action. July 12, 1888, while working on a building he suddenly fell forward and remained unconscious for half an hour. After an hour of stuporous sleep he rallied, walked some distance to his home, passed a fair night, and in the morning, feeling as well as usual, returned to his work. At the same hour he again lost consciousness, and presented the same train of symptoms as the day previously.

In falling the first time he is said to have struck his head in the frontal region, but nothing very definite is to be learned about it and no mark was left. From this time forward, about once a week, sometimes at longer intervals sometimes at shorter, he had a convulsion, and one day in August had four. These attacks presented the following features: Invariably the first symptom was pain and spasm in the right index-finger gradually involving the rest of the hand, spreading to the wrist and passing up the arm. The extremity presented a flexed attitude and rapid clonic movement. When the body was reached consciousness was lost, and the patient, if not in the recumbent position, would fall. The clonic movements then became general without a tonic stage, and often would persist as much as fifteen minutes by actual observation. During the clonic phase of the attack the urine would be voided, the tongue bitten, the head retracted, the eyes turned up, and all the extremities would be thrown about equally into movement. A stuporous sleep of about an hour would follow, after which full consciousness was restored until the next attack.

Later on the pain in the hand and fingers became constant and excruciating, preventing sleep, rapidly undermining the patient's strength and causing him to move constantly about seeking relief. His attitude was peculiar, his face expressive of intense suffering, and he continually rubbed and held his right hand with his left. He lost weight and strength and became weakened on the right side. The convulsions recurred at about weekly intervals.

January 25, 1889, he was admitted to St. Elizabeth's Hospital in the service of Dr. Coleman in substantially the condition above indicated. There was neither history nor trace of syphilis. Mentally he was very sluggish and very little beyond "Yes" and "No" could be elicited by questions. When standing, the right hemiplegia was manifested by the trembling knee. The right arm and forearm measured one-half inch

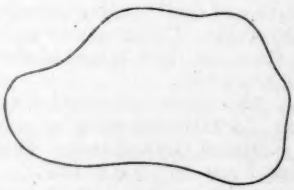
less than the left, and the hand and arm were in constant rigid flexor contraction drawn to and across the body. Any attempts to straighten the limb gave rise to great suffering. Tactile sensation was fairly acute, and there was no sphincteric weakness.

The reflexes, eyes, which were carefully examined by Dr. W. F. Coleman, muscular sense, and urine were normal. He had constant pain in the head, in the frontal region, which, when intense, passed over the vertex to the occiput. Percussion gave rise to a little tenderness on the left side of the head, but nothing distinct. He walked with a broad base as if he had "sea legs on," but his wife said this was natural to him. He presented a very peculiar and tortured picture with his agonized face, his rigid arm, his constant motion to secure relief, the hand enveloped in flannels and liniment or hot applications and carefully supported with the left.

Various plans of treatment were faithfully employed without benefit, and under the impression that the trouble might be peripheral, in the cervical and brachial plexuses, suspension was tried. The first time it caused a convulsion in a few seconds, but afterward was tolerated. From the nature of the convulsions and the general aspect of the case it was ultimately decided that there existed an irritating lesion in the left cortex involving the arm- and particularly the hand-centres, and causing the discharge of those regions manifested in the kinetic display above described. An operation was planned to uncover this area of the cortex and in the absence of demonstrable lesion to excise the faulty centre indicated by the signal symptom—that is, by the initial spasm in the right index-finger, as advised by Horsley. Consequently the patient was prepared for operation as in Case I., and the fissure of Rolando was marked out upon the scalp by a combination of the rules of Reid, Horsley, and Hare. The arm- and hand-centres were carefully delimited.

May 21. Under chloroform, with the assistance of Drs. Luken, Lawson, McCallum, and Kellog, in the presence of Drs. Coleman, Newman, Hall, and others, a flap four inches broad at its base anteriorly and five

FIG. 5.



Outline of opening in skull over left motor region. Reduced one-half.

inches long, including the pericranium, was raised, hemorrhage having first been controlled, as formerly described, by the interlocking stitches. The further technique of the operation did not materially vary from the procedure in Case I. The pulsations of the brain were normal and nothing unusual was found, but just when it had been decided to close the wound, near the anterior margin of the trephine opening a small node on the surface of the convolutions was noticed, differing in color

from the surrounding brain and distinctly firmer to the touch. The cranial aperture was enlarged in this direction, and a thickened cicatricial-appearing mass was found, having the size of a large bean, from which radiated filamentous processes reminding one of a large spider. In order to reach all of it, five buttons of bone were removed with a three-quarter inch trephine and an opening in the skull, the shape and twice the size shown in Fig. 5, made from a tracing taken at the time, was formed with the rongeur. It embraced the middle and lower thirds of the Rolandic fissure, the corresponding portions of the central convolutions and the speech-centre in the third frontal gyre.

The growth was then dissected away as completely as possible, causing the decortication of the brain to a depth of a quarter of an inch over an area larger than a silver dollar, and embraced in the anterior two-thirds of the skull opening. Irrigation was freely employed as in ordinary wounds.

The dura was carefully closed, drainage from the surface of the brain having been provided for by means of a rubber tube filled with iodoform wicking, and the buttons of bone and all fragments, however minute, were replaced, being, as in Case I., supported and drained by meshes of wicking which followed the other drainage out of the dependent part of the wound. A drainage tube also passed under the flap across the field of operation, and the scalp was closed by interrupted sutures. The usual ample gauze dressing was employed. The operation lasted two and a half hours, but was not attended by shock or notable depression.

The following condensed notes were made by the interne, Dr. McCollum, now of Oakland, California.

May 22. Day after operation. Passed a quiet night. The face is drawn to the left. Right hand paralyzed and right side paretic. Sensation is fairly acute. Cannot form words in reply to questions, but repeats words after hearing them. Tongue protruded with difficulty and to the right. Pain has left the right hand. Toward evening the dressing was changed, being soaked with a large quantity of sanguinolent fluid. The anterior portion of skull opening pulsates; the posterior portion is fairly firm to the touch. Patient sat up and drank a little milk, but is liable to lose it from the right corner of the mouth. Temperature, 7 A.M. 97⅘°, at 9 P.M. 100⅘°.

23*d*. Rather restless. No control of bladder and rectum. Motion on right side improving. A little twitching at times on right side of face. Drainage-tube shortened one-half inch. The scalp is œdematous. No pain. Temperature, 7 A.M. 98°, 9 P.M. 100°.

24*th*. Slight improvement in motion of right lower extremity. Has a little pain in right hand, which is partly flexed again. Articulation improving. Temperature, 98⅘° to 99⅘°.

25*th*. Stationary.

26*th*. Dressing changed. The œdema of scalp is gone. Half the stitches were removed. Pulsations are less marked. Most of the wicking was withdrawn. Temperature normal.

28*th*. Improvement in speech. Dressing changed. All drainage removed and the remaining stitches, which produced some twitching in

the right arm. With closed eyes cannot locate a pin-prick on right side, but feels it promptly and keenly.

30*th*. A little suppuration in lower angle of wound. Introduced a few strands of iodoform wicking for drainage after removing a couple of stitches which had been overlooked.

31*st*. Restless during the day and toward evening stuporous and hard to rouse. No control of sphincters since operation. Hand and face on right side quivered a little to-day.

June 1. Brighter. Bowels have acted under saline. Temperature normal.

15*th*. Steady improvement in all particulars. Muscles react to faradism and less strongly to galvanism. There is a tendency to flexor contraction of right hand and arm, which can be overcome only with difficulty, but without pain. At various times this extremity has presented marked twitching. From the wound there is still a little discharge and several small pieces of bone have come away. Has rather better control of his bladder. Sits up an hour or two each day, and enjoys his pipe, which shows a fair control of facial muscle, and no longer lets fluids run out of the right corner of his mouth.

18*th*. The dressing showed considerable discharge and some dead bone. There is considerable œdema. Patient weaker. Temperature 100°; pulse 92.

19*th*. Patient losing ground. Temperature 100⅘°; pulse 100. A few drops of pus on dressing. Had a slight chill during the day.

The face was drawn more to the side, fluids again escaped from the corner of the mouth, speech was impossible, the motor power of the right arm and leg had disappeared, the facial expression was anxious. These symptoms, with the chill, rise of temperature, and slight amount of pus found on the dressings pointed to the formation of an accumulation of pus within the cranium and in the field of the former operation. It was decided to open the skull again and explore the brain without delay.

Second Operation.—*June* 20, 1889. Under chloroform an incision four inches long was made through the united flap longitudinally and over the long diameter of the skull opening, laying bare the field of the former operation. Two of the trephine buttons were found tilted up and making pressure upon the brain. All the trephine and other fragments were removed except one button at the highest part of the opening which was allowed to remain, as it looked partially healthy and gave promise of uniting to the cranium. Some of the fragments presented a condition indicative of vitality, while others were bleached white, and evidently either to be cast off or encysted. Through a minute opening in the dura, so small as to prevent drainage, and not admitting a fine probe, a drop of pus could be expressed. An incision opened into a cavity containing about an ounce and a half of thick, cheesy, odorless pus, and was first explored with a narrow forceps, and then with the finger, which was introduced its length, two and three-quarters inches, in the direction of the body of the sphenoid, but whether the ventricles were invaded or not could not be determined. Careful search was made in all directions with the finger to determine the presence of any other accumulation without result. The cavity was freely irrigated. Considerable cerebral fluid escaped during the manipulation. A drainage-tube seven-eighths of an inch in circumference was introduced to the bottom of the cavity, requiring four inches of length to reach to the bottom.

The scalp-wound was duly closed, and the head dressed as formerly. The temperature immediately fell, and at 1 P.M. was 99⅕°; the operation being done by 9 A.M. Toward evening the patient was much brighter, and ate a light supper.

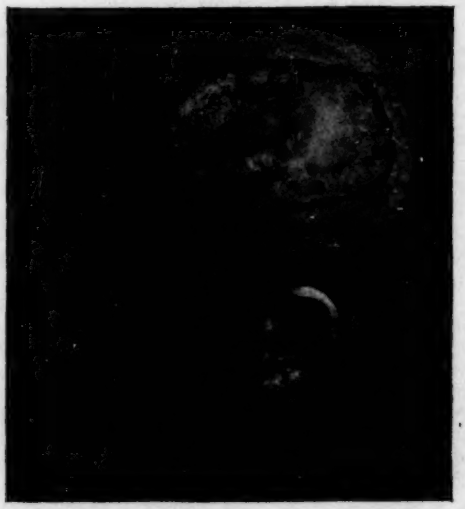
21*st*. Bowels moved in bed during the night. His voice is stronger and he articulates "Yes" and "No" much louder and more distinctly. Temperature 99½°. Right side completely paralyzed.

22*d*. Complains of pain in the head and face. Can use the bed urinal, but soils the bed with bowel movement. Temperature 98⅘°.

23*d*. No change.

24*th*. No voluntary movement. Improving articulation. Drainage-tube taken out and replaced. It contained a little fluid, some pearly bodies, and a few membranous shreds, but had attached to its extremity a tubular glistening sac about three inches long, evidently the lining of the old pus cavity. Examination shows this to be made up of fibrous material of a very firm and rigid sort, staining but poorly, and looking almost chitanous under the microscope. It presents no nerve elements.

FIG. 6.



From untouched photograph showing cicatricial lines of incision for first and second operations, and pulsating depression at site of cranial opening.

25*th*. Temperature normal.

26*th*. Temperature normal. Mentally improving.

27*th*. Head dressed and drainage-tube shortened a half inch. Remaining stitches removed.

July 4. There has been steady and uninterrupted improvement in speech. He can flex the right hand a little. Complains of a little pain

in frontal region. A counter-opening was made under the scalp, and some wicking drawn through to favor better drainage.

7*th*. Walked half-way across room. Temperature always normal.

10*th*. Motion is returning in hand and arm. Shows slight movement in fingers, thumb, wrist, and elbow.

17*th*. Walks with very slight dragging of right leg. A little pain in right arm. Reflexes equal and normal. Movements all improving.

August 15. Steady improvement in all particulars. He has fair control of right hand and side. Free from pain and convulsions.

September 7. Three and a half months after operation. Had an epileptic attack last night.

The condition of the head and scalp is shown in Fig. 6, from an untouched photograph.

Examination of the growth removed at the first operation determined it to be sarcomatous, and its wide ramifications had doubtless precluded its entire excision. The convulsions returned after the last date in a generalized form marked no longer by localizing symptoms, but usually the patient had a feeling that he was to have an attack, and could prepare for it. It was probable that the neoplasm had recurred, and was of wider extent and distribution, in view of which further operative interference was deemed inadvisable.

The patient is still living, and in a fair degree of physical health, subject to convulsions about once in ten days. He has had some return of the pain, variously distributed, and comparatively light in character. There is but a very slight paresis of the right hand and arm. However, his condition even now is much better and more endurable than before the surgical interference, which undoubtedly secured him great relief from pain, and a couple of months of comparative health, with complete freedom from convulsions. The nature of the lesion alone seems to have prevented a complete cure.

Case III. *Idiocy with generalized and continuous choreoid movements of seven years' duration. Trephining over motor zones; complete cessation of movements without paralysis; death on third day.*—Barney F., eight years of age, was born in Germany of healthy parentage. There is no history of family neurotic taint, and four younger children, brothers and sisters, are in perfect health. The mother insists that she carried him a year *in utero*, but the birth was not unusually difficult and without instrumentation. He appeared in all respects as other infants until the age of three months, when he was one day found with pale face, blue lips, eyes rolled up under lids, and unconscious. He was restored with difficulty in half an hour. The parents thought the infant had been accidentally smothered with pillows thrown on him by other children, but of this there is no surety. At the age of one year he made a crying or calling noise in the night, and was again found in a similar state, lasting a considerable time. From that date he showed choreic movements without interruption. He has never talked, and the use of hands, arms, and legs is very imperfect, as is his control of bladder and rectum. The gait is peculiar, the weight being carried on the toes unsteadily owing to the choreic contortions, and when standing he usually is bent forward with his hands between his knees, like one suffering with cold, his face meanwhile grimacing and his mouth in motion like an animal taking the teat. He gnaws his fingers, pulls at his ears, and when undressed constantly toys with his penis. At times he will rub

the back of his head for a quarter of an hour continuously. He can only articulate the one word "ma," and attempts no response or recognition on being spoken to, though hearing and sight are fairly acute. He manifests likes and dislikes in regard to his food, and has some faint idea of right and wrong, or at least knows when to expect punishment. His mother and brothers and sisters he recognizes at once from other people, and manifests some affection for them, but his intelligence is very feeble. The face, trunk, extremities, and eyes are in constant choreic action during the waking hours, but when asleep there is complete freedom from such movement. At times he is noisy, making peculiar animal-like grunts and bellowing sounds. Physically the health is fair. The head is much contracted anteriorly, as is not unusual in such mental states. (Fig. 7.)

FIG. 7.

Showing characteristic attitude and grimace in Case III.

In substantially this condition he was admitted to St. Elizabeth's Hospital July 15, 1889, in the service of Dr. Frank, his parents clamoring for an operation on the brain, having learned of the case of May M., who at that time was presenting great improvement. The gravity of the matter was fully explained to them, and its experimental nature as well as the lack of indications of localizable lesions. It was clearly pointed out that the operation would be exploratory, and probably would result in finding nothing. Finally, upon the continued solicitation of the family, and with the advice of Dr. Luken, attending physician, it was decided to explore the brain. The head was accordingly prepared for the operation in the manner already indicated.

July 19, 1889. Chloroform was used. Dr. Frank operated, assisted by Dr. Luken and the hospital staff.

First, on the left side three buttons of bone were removed, one with a trephine one and a quarter inch in diameter, the others with a three-quarter inch instrument, making an opening about one and a half by two inches. Nothing unusual was found but the dura, which was fully twice an ordinary thickness. A similar opening was also made on the right side, but a little smaller, and through these the inside of the skull, of the dura, and the surface of the brain were thoroughly investigated. The dura was equally thick on the right side. A little of the brain tissue, thirty-two grains in all, was removed from the motor cortex on both sides, and mainly from the ascending gyres. The wounds were then closed, drained, and dressed as already described in the preceding cases.

The patient recovered promptly from the operation, and twenty minutes after being put to bed made voluntary movements with all his extremities except the right arm. Toward evening he was restless, and received hypodermically one-sixteenth of a grain of morphine, which was repeated at midnight. *Free from choreic movements.*

20*th*. 7 A. M. Had a fair night. Has good use of all his limbs. The reflexes are intact. Swallows liquids put in his mouth. Temperature 101° F.

8 P. M. The dressing is soaked through, and when changed gave rise to considerable vigorous struggling. Patient would look up when called by name. Temperature 99½°.

Midnight. Temperature 100⅘°. Pulse strong, full, and easily counted.

FIG. 8.

Portion of thickened dura with adherent bone buttons removed post-mortem. A few strands of iodoform wicking are attached. One-half actual size.

21*st*. Passed a quiet day. He can use his legs better than his arms, which he moves but seldom. Temperature, at 7 A. M. 99⅘°, at 7 P. M. 101 9/10°. At this later hour he is stuporous and hard to rouse. He swallows readily, and grunts in his peculiar way a good deal. 9.30 P. M. Dressing changed, as it was saturated with fluid from within

the skull, the scalp wound being quite dry, and mainly from the right side. *No choreic movements.*

22*d*. 7 A. M. Rested quietly. About 2 A. M. showed some difficulty in swallowing. Temperature 100⅘°; pulse 150, and very small. Cannot swallow. Lies perfectly still. Reflexes abolished. Died at 8.40 A. M.

The *post-mortem* examination, made very hastily, as it was objected to by the parents and went no further than the skull, showed the parts to be all healing by first intention, and very nicely. The buttons of bone in this short time were already firmly adherent to the dura, and two of them so attached are shown in Fig. 8, from a recently made photograph of the alcoholic specimen. There was a disintegrating small clot at the site of the subdural drainage-tube, and a small area of brain substance broken down at the same point. About the brain there was nothing abnormal; the dura was uniformly and everywhere greatly thickened.

CASE IV. *Fracture of the skull. Subdural hemorrhage localized. Trephining and removal of clots with relief of symptoms; death due to intra-abdominal hemorrhage from ruptured liver.*—Mary K., æt. twenty-three, an unmarried Bohemian servant-girl, was admitted to St. Elizabeth's Hospital November 21, 1889, in a comatose condition, and assigned to the service of Dr. Frank. During the summer she had suffered continuously with articular rheumatism. In the previous five weeks there had been a severe exacerbation, from which she was just convalescing. A few days before the accident which led to her admission she had manifested a complete change of disposition, becoming quarrelsome, depressed, and fault-finding, instead of cheerful and contented, as was her natural wont. She was emotional and despondent. About noon on the above date, shortly after going to the closet, she jumped from a third-story window, evidently with suicidal intent, and struck upon a wooden pavement, but just how she came in contact with the ground could not be ascertained. She was picked up insensible, and brought directly to the hospital. Deep coma and stertorous breathing were present. Blood oozed from the left ear and nostril, and there was a slight contusion of the scalp over the right parietal eminence. The left pupil was widely dilated and immovable. There was no recognition of, or reaction to, painful sensations. The left arm was completely paralyzed and relaxed, the left lower extremity less so. The right side showed a little resistance to passive movements. Five ribs, from the fifth to the ninth inclusive, on the right side were fractured.

Guided by the bleeding from the left ear and nostril the skull was trephined with a large instrument of an inch and a quarter diameter, through the squamous portion of the left temporal bone, which showed a stellate fracture. The dura bulged without pulsating very firmly into the opening and felt very tense. When a slight opening was made in it there was an alarming spurt of bloody fluid which streamed out as under great pressure to a distance of three or four feet, probably as much as six ounces so escaping. The meningeal artery was tied and the dura raised as in the preceding cases. A few insignificant clots were found and a little oozing of blood from the brain surface. The skull was explored in all directions with the finger within the dura, and as far as possible between the dura and the bone, but no inequalities were palpable. The operation was commenced without an anæsthetic, but in placing the interlocking stitches some pain was occasioned and the

patient freely moved the right extremities, but never made any movements on the left side. Chloroform was used to produce anæsthesia.

The left hemiparesis persisting after the above-mentioned procedure, it was determined to open the right side of the skull over the motor area. A director passed through a small incision in the contused scalp and carefully swept around on the surface of the skull finally detected a fracture, without depression or displacement, near the parietal eminence. In the usual manner the skull was trephined at this point and the tense bulging dura exposed. There was considerable bleeding from the bone which was readily and instantly controlled by means of the pins of decalcified bone, shown in Fig. 9, devised for this purpose by Dr. Frank

FIG. 9.

Pin of decalcified bone to control hemorrhage in bone operations.
Two-thirds actual size.

and manufactured by Schorse & Co., of Milwaukee. They have proven of great value in other operations upon osseous structures. On this side even a greater quantity of fluid similarly escaped. The amount so evacuated was not measured, but must have been altogether at least twelve ounces.

After free drainage had been secured on the left side it was difficult to understand the persistence of pressure on the right and the retention of this fluid. The query was raised whether the falx under such circumstances could act in a valvular manner. When the dura was opened large clots were found covering the surface of the brain on its lateral convexity and extending into the posterior cranial fossa on the right side. They were scooped out and much bleeding ensued from the pial circulation, which seemed also to be the source of the clots. By exploring in all directions with the finger the arachnoid was broken down, and this, as in the first case, was followed by cessation of hemorrhage.

The wounds were closed, drained, and dressed as already described. The breathing at once became natural and the patient moved all her extremities freely during the completion of the dressing, and subsequently upon painful stimulation. Complete consciousness was never regained and she gradually sank and died twenty-four hours after the operation.

By *post-mortem* examination the skull was found widely fractured from the right parietal across the vertex to the opposite temporal bone, then through the petrous portion, the roof of the orbit, and the cribriform plate of the ethmoid. A small fragment from the lesser left wing of the sphenoid was completely separated. The operation wounds were dry and aseptic and the cerebrum looked clean and smooth as if it had never been covered with clots and effused fluid. The abdominal cavity was filled with blood from a rupture on the surface of the liver corresponding to the fractured ribs, and to this death can reasonably be attributed.

In these operations a number of practical points were developed. The control of scalp hæmorrhage with the interlocking stitches was very satisfactory, and when black and white silk were alternated the

manœuvre could be quickly and readily executed. The special forceps figured in Fig. 1 also gave great assistance. The use of irrigation on the brain tissue, though not heretofore advised, proved a great help in clearing the field of obscuring blood, and properly employed with a low pressure seems perfectly allowable. It certainly is less severe upon the cerebral structure than sponging. As to drainage, tubing undoubtedly has the disadvantage of being bulky, but the large amount of fluid regularly discharged in such cases requires an adequate means of escape, otherwise pressure will be brought to bear on the dural flap and probably defeat its union by first intention, upon which so much depends. The dressings must be such as to care for this discharge and for the same reason require frequent changing.

When the bone is to be replaced it should be taken out in as few pieces as possible, preferably in a single piece. The return of small fragments and chips as shown in these cases is of doubtful utility. Efforts may profitably be directed to securing the returned bone to the cranium in the most desirable and favorable position for immediate union and the prevention of deformity. Upon this, ultimate success and the bony protection of the encephalon may hinge.

The brain's tolerance of prolonged and vigorous manipulation is forcibly demonstrated, and its recuperative power after injury and regional loss is again made manifest.

CLINICAL RESULTS OF GASTRIC FARADIZATION.[1]

By Charles G. Stockton, M.D.,
Professor of Principles and Practice of Medicine and of Clinical Medicine, University of Buffalo.

For some years various gastric disorders have been treated by electricity, both the continuous and interrupted currents being employed. Somewhat over two years ago it occurred to me to employ the current from within the stomach, and to this end I contrived an electrode, a description of which was published in *The Medical Record* of November 9, 1889. Clinical reports of my experience with this method of treatment have been promised for some time, but, for various reasons, the fulfilment of the promise has been delayed until the present. For convenience' sake it seems best to speak first of those disorders of digestion which depend upon structural diseases of the stomach, and second of those disorders that are functional in character.

Of the disorders depending upon structural diseases, electricity has

[1] Read before the Fifteenth Annual Meeting of the Alumni Association of the University of Buffalo, Medical Department, 1890.

been chiefly employed in the treatment of gastric dilatation and disturbances depending thereon. Of the cases of dilatation of the stomach, those depending upon stenosis of the pylorus or intestine are usually less amenable to treatment of any kind, and I am not aware that I have had special benefit from the use of gastric faradization in these. My experience leads me to believe, however, that the great majority of cases of dilated stomach are unattended by intestinal stenosis, depending rather upon imperfect innervation of the gastric walls, upon the over-distention of the organ with food and drink and also upon the long-continued eating of bulky and coarse articles of diet that are slow of digestion. I am led to this belief from the comparatively large number of cases of this kind which have come under my observation during the past five years, and in this class of cases the use of gastric faradization has been very beneficial. The good results are shown in the lessening of the size of the stomach, in the increased power of motion during digestion, in the ability of the stomach to empty itself, in the establishment of proper gastric secretion, and in an increased absorptive power.

This will be best illustrated by the following case:

Mr. K., of German parentage, aged forty-five years, by profession a merchant, had for several years been the victim of chronic gastric catarrh with dilatation. The disturbance appeared after a period of overwork, business anxiety, and rapid and irregular eating. His habits were otherwise good. He had enjoyed good health previously, save an attack of typhoid fever early in life.

The patient was sent to me two years ago in April by Dr. Park, of this city, and was found to be suffering from loss of appetite, gastric distress, occasional attacks of vomiting, during which articles of food were ejected which had been swallowed two or three days before, also large amounts of mucus. There was always a sense of weight and distress in the epigastrium; his bowels were constipated; urine alkaline, phosphatic, and at times containing crystals of calcium oxalate in abundance. He had lost greatly in flesh, slept but little, was peevish, irritable and melancholy. The treatment established was daily lavage, which relieved his catarrh but not the dilatation. The stomach contained three quarts of fluid by measurement, and its lower border was one and a half inches below the umbilicus. The electrode was now employed, at first daily, subsequently twice a week, in sufficient power to produce a marked contraction of the stomach, after the organ was emptied through the gastric tube.

In this case I employed mostly faradism. For about two weeks I employed the continuous current in sufficient strength to produce redness at the site of the negative pole, which was applied over the spine. It appeared to me that my best results were obtained from faradization, and the treatment was continued for about one month. Two months after beginning treatment the man was discharged well and he has continued so to the present time, his proper digestion having been restored, the

patient sleeping well, having gained in flesh, having returned to his business responsibilities, which work he again enjoys. Beyond the treatment mentioned and care in diet, little other therapeusis was employed.

I could add to this history those of a number of other equally successful cases. I have never been disappointed in the use of the current in dilatation of the stomach, but I have never practised it where I believed intestinal stenosis to be the causative factor.

Let me now call attention to the functional disorders of digestion, which, it would appear, are far more common than those depending upon structural change. Of the functional disorders of digestion, it may be said, there are (1) Motor disorders, (2) Disorders of sensation, (3) Disorders of secretion, and (4) combinations of the foregoing. Such patients are usually neurotic and have been subjected to unusual mental strain or worry, have overtaxed the digestive apparatus in the vain effort to supply an overworked nervous system, and appear before us in the persons of accountants, teachers, active business men, professional men, and the neurasthenic generally. It has always been found a matter of great difficulty to restore the equilibrium of health in these individuals, for the reason that, beside rest, good nutrition is necessary, and, with the gastric disturbance, good nutrition is often impossible. It occasionally happens that rest alone will so restore the general innervation that digestion is improved and the case requires no further attention. But more often, before rest is practicable, relief must be afforded to the stomach distress, which is the all-important matter in the patient's mind.

To follow the classification above made, attention is first invited to the disorders of motion. These are usually accompanied by other gastric disturbances, but occur occasionally as pure motor affections characterized either by excessive activity of the stomach walls during digestion or a lack of such activity; occur as too early relaxation of the pylorus, or too late; occur as a relaxation of the cardia, which results, during the churning motion of the stomach, in regurgitation of food, gas or both, not necessarily in the form of vomiting, but constituting what we describe as repeating.

A very unusual case of this sort was that which came under my notice through the politeness of Dr. Maus, of the U. S. Army.

It was that of a young woman of American parentage, about twenty-five years old, who had enjoyed good health until some eight years before my examination. Her trouble showed itself in the regurgitation of food coming on almost immediately after eating, mouthful after mouthful being discharged until her stomach was empty. The disturbance increased in intensity until, from the very rapid emptying of the stomach, it had the appearance of vomiting, which, in fact, it was not.

The act itself reminded one of the regurgitation practised by ruminants. The digestion was otherwise not disturbed. There was no unnatural fermentation, the food returned had not an unpleasant taste and the digestion seemed to have progressed as far as was possible in the time that had elapsed since ingestion.

All manner of treatment had been applied. The lady had consulted physicians in many of our important cities, and she had been prescribed for by a number of distinguished men. Nothing had afforded relief. Dr. Maus very kindly carried out my suggestions as to treatment, which were that, before eating, the stomach should be irrigated and gastric faradization practised for fifteen minutes daily. He, of his own accord, also placed the patient in bed for an hour after each meal. The treatment was soon followed by benefit, the regurgitation came on later and the discharges were less frequent and in smaller quantity. The patient began to improve in flesh, having previously been much emaciated. After two weeks' treatment, she was able to retain a meal of moderate proportions without regurgitation. Four weeks later she discontinued the treatment and considered herself practically well. This case was of such unusual interest and showed such unmistakable benefit from the use of the faradic current that I feel confident of the influence of gastric faradization on motor disturbances.

I have had equally good results in the treatment of those cases in which the stomach too early empties itself through pyloric relaxation, resulting in intestinal indigestion accompanied by lienteric discharges; also in cases of a mixed type, of which I have spoken above, in which there is a sensation of motion in the stomach accompanied with borborygmus and pyrosis.

The treatment as applied to those cases in which there is disturbed sensation, and especially gastralgia, may be illustrated by the following case:

Mrs. G., a very neurotic woman, about thirty, who had suffered for several months from indigestion accompanied by pain, sometimes very intense, lasting for hours. No remedy short of an anodyne had been found equal to its relief. Gastric faradization was followed by cessation of the pain after half a dozen sittings, not to recur again. Meantime and thereafter, the patient's general health was improved by systemic treatment.

Such cases are common enough and they have generally been promptly relieved by this form of treatment. The same experience has been had by professional friends who have practised this method.

Now as to the third class of cases, or those depending upon a disturbed secretion: the most important, to my mind, are those wherein there is excessive secretion of hydrochloric acid, which is continuously present, and, when the stomach is empty, gives rise to gastralgia and pyrosis, sleeplessness, melancholy, and loss of flesh. These cases are much more common, it appears to me, than is generally supposed, and they seem to be steadily on the increase. It is not always necessary to resort to fara-

dization for their relief, and, when possible, I have avoided this somewhat troublesome procedure, but when practised it has been of undoubted service, which was particularly shown in the following case:

A young physician of this city was prostrated one night by a hematemesis. This experience was a great surprise to him as he considered himself in good health and had not suffered especially from his stomach. It was believed that he was the victim of round ulcer, and he was treated accordingly. As soon as practicable, the gastric contents were examined, when an enormous amount of hydrochloric acid was found present at all times. Efforts to overcome this by the administration of alkalies were unavailing. A large amount of gas would be discharged, a momentary relief experienced, but soon after hydrochloric acid was found present in its usual abundance. A strict albuminoid diet was established, gastric sedatives of various kinds prescribed, the eating of ice was allowed as an experiment, the drinking of hot water was tried, but none of our efforts gave relief. The stomach after being thoroughly irrigated showed in a short time hydrochloric acid as usual. This was demonstrated not only by the intensity of color in the phloro-glucin vanillin test but by the quantitative examination suggested some time ago by Dr. Kinnicutt, of New York. This method of examination my patient carried out for himself very carefully, and he determined that none of the remedies lessened the acid.

At this time gastric faradization was begun and continued regularly—if I remember correctly, daily—for about three weeks, and coincident with this he began to improve, and while he did not demonstrate by daily examination that hydrochloric acid was steadily decreasing, he felt satisfied of this by the disappearance of symptoms which doubtless had depended upon its presence. The improvement was continuous and the patient was soon restored to health.

This case was a phenomenal one in the intensity of its early symptoms, the great abundance of hydrochloric acid, and its obstinate resistance to treatment, and, to my mind, equally remarkable was the relief which apparently followed the use of gastric faradization.

I can report no other case of equal severity, but I could mention a number of others which have shown rapid diminution of hydrochloric acid under treatment by gastric faradization—for instance, that of Mr. D., a young business man, aged thirty, suffering from neurasthenia with acute indigestion and excess of hydrochloric acid, relieved by lavage before his six-o'clock dinner, and the employment of faradization for a period of not over two weeks. In his case, the trouble recurred and he was subsequently treated without faradization, and he improved, but not as rapidly as when faradization was practised.

I might also mention the case of Mrs. F., a young mother who, after lactation, suffered from gastralgia and pyrosis, which were relieved by an albuminoid diet supplemented by faradization, the most marked improvement being under faradization.

In these cases I have found it expedient to direct frequent small meals

of albuminoids, and between these I am in the habit of administering gastric sedatives. Exactly what *rôle* is played by faradization I am unable to state; whether it is a gastric sedative or a gastric stimulant, I do not know. My efforts were in the direction of study and the results were so favorable that I applied faradism to cases seemingly contradictory in character and I have concluded that the great variety of gastric neuroses depend upon a common cause—an imperfect innervation of the stomach; that electricity improves this innervation, thereby relieving the cause and so the conditions which, at first thought, are so contradictory.

I may add, by the way, that this last class of cases, in which there is an excess of hydrochloric acid secretion, is far more common than any other variety of functional disturbance; that these cases are greatly improved by the albuminoid diet there can be no doubt. A diet of starch seems especially disturbing, a fact which was something of a puzzle to me until my colleague, Prof. Pohlman, informed me that he found in dogs that cooked starch was almost entirely absorbed from the stomach without passing into the duodenum; that although in the dog's stomach hydrochloric acid is in greater proportion than in man's, if it appeared in excess the digestion of starch in the stomach was hindered; and, if the acid was in great excess, absolutely prevented.

I had supposed that the action of ptyalin upon starch ceased in an acid medium, and that, therefore, starch digestion was quite uniformly interrupted in the stomach; but Prof. Pohlman assures me that the contrary is the case, that the digestion of starch is not interrupted in the stomach save when the gastric juice has hydrochloric acid in great excess.

With this light it is easy to understand how a reduction of the hydrochloric acid will improve the digestion of starches and it is a clinical fact that when relief from acid is obtained by faradization, or other means, the digestion of starches is made more easy and the patient is able to return to a mixed diet.

I do not claim for gastric faradization the cure of every ail the stomach is heir to, but that it is a useful measure and one that succeeds in difficult cases when ordinary methods are attended with poor results.

The question naturally arises, What is the effect of gastric faradization as compared with that of the application of the continuous current? While I have devoted some time to the study of the continuous current, I do not feel prepared to offer positive views concerning its special applicability, or the comparative merits of the two currents in these diseases. That there is a wide field for the special effects of the continuous current employed in this way, I have no doubt. It would appear that we could possibly promote or retard the secretion of acid at pleasure; that we might improve the innervation of the stomach, that we might contract

the stomach walls when the faradic current in ordinary strength is ineffectual, but on these questions I do not feel like speaking authoritatively. However, I assume quite another attitude on the subject of faradization; I am even complaisant under the incredulous smiles of my professional friends. Let someone deny its usefulness who has tried it.

ON FALSE PREGNANCY.

By Thomas More Madden, M.D., F.R.C.S. Ed.,
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In the course of long obstetric experience a considerable number of cases of false pregnancy have come within my observation. In some of these the patient had been previously under medical treatment without recognition of the true nature of her condition; and in others its investigation ultimately became the subject of legal inquiry and elicited very divergent opinions from the several experts examined. In one remarkable instance of this kind I was called on to disprove the physical possibility of maternity in the case of a lady who had pretended to give birth to a child, which having been accepted as his own by the alleged father, was, after his death, on legal investigation deprived of the inheritance thus acquired. In consideration, therefore, of the comparative frequency of cases in which symptoms of pregnancy may be simulated by disease, and the possibility of their being counterfeited by design, as well as their clinical interest and occasional medico-legal importance, some observations on this subject to which, many years ago, I first directed attention in the *Transactions* of the former *Dublin Obstetrical Society*, may not be devoid of practical utility.

Under the heading of the present communication two conditions of a distinct character are included, viz.: First, cases in which symptoms dependent on disease may give rise to unfounded belief in the existence of pregnancy; and secondly, the less frequently met with class of cases in which symptoms of gestation are decidedly counterfeited. With regard to the former, it may, and indeed often does occur, as was well observed by Dr. Montgomery,

> "that a woman with an enlarged belly arising from some purely accidental or morbid cause, becomes an object of suspicion, and afterward the sudden reduction of her size may, however, unjustly affix upon her the imputation of clandestine delivery; and although such charge may never be made the subject of a legal or criminal investigation, its influences would be alike unjustly prejudicial to the character of the individual and injurious to the moral interests of society."

Such cases are, however, fortunately of less common occurrence than those in which pseudocyesis is not the occasion of reproach, but rather,

for a brief period at least, a matter of congratulation for its subject. This occurs in nine cases out of every ten of the kind in childless women desirous of offspring, and in exemplification of the old adage, "The wish is father to the thought."

In this way it happens that spurious pregnancy is as often psychological as physical in its origin, and in either case is no less commonly met with in hospital practice amongst the poorer classes than it is in those belonging to the wealthier ranks of society, whose idle, overfed, sterile matrons are supposed by some to be its only victims. In both classes, however, it is most commonly met with in previously sterile women at about the period of the menopause, although in some exceptional cases I have observed it in pluripaæ, and at a very early age.

Where this condition is thus psychological, its recognition is comparatively easy, but its management is more difficult than in those cases presently to be referred to, where it results from physical disease. Nor do I know any duty more thankless and unpleasant than that of the consultant when obliged, as I have too frequently been compelled, to disillusion a patient who, having persuaded herself and those about her that at last she has become pregnant, has made the usual preparations for the expected event, and ultimately is, by some anomalous abdominal pain, deceived into fancying herself in labor, and under that impression sends in haste for medical assistance. In such a case I have more than once been called in consultation to the aid of a young practitioner, who unfortunately allowed himself as well as his patient, to imagine not merely that she was pregnant, but actually in labor; and I have sometimes found it no easy matter to smooth over the trouble in which both patient and doctor were involved, and to prevent the latter being (and perhaps not undeservedly) made the scape-goat for all the vexation of which a woman's wounded pride may be conceived capable under such circumstances.

The possibility of pseudocyesis should, therefore, never be lost sight of in accepting an obstetric engagement; nor should one ever be booked down as a mere matter of routine and without sufficient inquiry to prevent such an untoward mistake, than which few errors of judgment might be more prejudicial to a practitioner. In many instances the diagnosis is by no means facile, especially in the case of patients who have borne children and hence are conversant with the symptoms of the condition which they desiderate, and to which they have persuaded themselves they have again attained. Nor is it less difficult when our would-be clients are sterile, *passé* married women craving for offspring, that, having familiarized their minds with everything relating to this subject, have become monomaniacs thereon, and who oftentimes succeed in deceiving others as well as themselves.

In this way, and more particularly when dealing with women approach-

ing the menopause, we may have presented not only the Protean nervous and sympathetic disturbances supposed to indicate pregnancy, but also many of its common symptons, such as morning sickness following suppression of menstruation, enlargement of the mammæ and areolar papillæ, or even the secretion of a lactescent fluid, which I have seen triumphantly expressed in proof of her supposed approaching maternity by a patient whose uterus was void of any fœtal tenant. If at the same time the abdomen, whether from mere obesity or flatus, the rumblings of which are insisted on as evidences of the movements of the imaginary fœtus, or from any more tangible morbid condition becomes gradually increased in bulk (though in such cases this increase is nearly always much more rapid than occurs at the corresponding period of normal gestation), then heaven help the practitioner who ventures to suggest a doubt as to the nature of the case!

The causes of pseudocyesis are indeed Protean in their variety and complexity, and oftentimes manifest themselves in such a form as to give rise to no little difficulty in their differential diagnosis. Thus, in addition to those already alluded to, namely, change of life, hysteria, and obesity, the existence of pregnancy may be counterfeited by various intra-peritoneal morbid conditions, including, amongst many others, ascites, ovarian, tubal, and uterine tumors, physometra, hæmatometra, etc.

The most important, however, of the conditions by which a woman not quick with child may be led to indulge in the delusive anticipation of maternity, is the so-called molar pregnancy, in either of its two well-known forms, viz., the *mola sanguinosa*, or else the *vesicular*, or as it was formerly termed, the hydatidiform mole. The latter is by far the most practically interesting in this connection of all these, as it is that most frequently met with. Having, however, elsewhere fully discussed the pathology of this condition, I need not here enlarge on it beyond observing that its presence is dependent on myxomatous proliferation in the placental chorionic villi of a disintegrated ovum; although it may be added that in some exceptional instances very similar-looking growths have been found *in utero* under circumstances which precluded the possibility of impregnation.

In all the instances of this kind that I have met, with only two exceptions, the patients, whilst suffering from myxoma of the placental chorionic villi of a blighted ovum, still supposed themselves carrying a living child, the imaginary movements of which they insisted they were conscious of, until ultimately undeceived by the expulsion of the vesicular growth, which generally occurs at about the fifth month, when by its bulk uterine irritation and expulsive action are produced. Nor before the fourth month is there any possibility of discriminating with certainty between molar and true pregnancy; but after this period the absence

of the positive signs of gestation should, of course, enable us to determine the question, as these can neither be simulated by disease nor counterfeited by design.

In almost every case of pseudocyesis, however, it may generally be ascertained that there is something unusual in the symptoms: either some essential one is absent, or else the symptoms that belong to one period of pregnancy manifest themselves at another and commonly an earlier time than usual.

Until the fifth month physical examination affords us comparatively little assistance in such cases, and, as a rule, neither patient nor physician ever dreams of the possibility of the case being one of spurious pregnancy at a previous date. From that time the recognition of the sounds of the fœtal heart, and, though with less certainty, the placental bruit, under ordinary circumstances affords the obstetric expert the means of discriminating between true pregnancy and pseudocyesis. Nevertheless, I must still confess myself somewhat sceptical with regard to the value of the information thus obtained by some practitioners as a test between these conditions. Even in the last month of pregnancy the non-distinguishability by an expert of the fœtal heart at the moment of examination is, *per se*, no absolute proof, as I have elsewhere shown, that the uterus may not then contain a living fœtus. How much less reliable, therefore, is this negative evidence when employed, as it often is, at a very early stage in such cases, and perhaps then by those who are not specially expert either as auscultators or as obstetricians. Nor is even the positive proof of pregnancy derivable from the stethoscope by any means as certain as a diagnostic, in the hands of the average medical practitioner, as is commonly regarded. I have myself seen this exemplified even by men of some experience, who had persuaded themselves that they could recognize both the fœtal heart-sounds and the placental bruit in cases in which neither existed, and who, on the faith of this supposed evidence of pregnancy, pronounced in haste opinions which were subsequently repented at leisure.

A more generally available test in such cases is that afforded by a properly conducted bimanual or conjoint abdominal and vaginal examination, by which the exact size and position of the uterus may be readily ascertained, as well as the cause of its enlargement in the latter months, though not in the early period of the supposed pregnancy. In those cases of pseudocyesis, in which the patient, being anxious to be thought pregnant, contributes, as is often the case, to the deception by making her abdominal muscles so tense and rigid that it becomes difficult to determine otherwise the condition of the uterus; this may easily be overcome by examination under chloroform.

It would be needless here to dwell on the diagnosis between pregnancy and those morbid conditions by which it may be simulated in cases of

pseudocyesis, as the differentiation between the various uterine, ovarian and tubal, and other intra-peritoneal tumors and diseases should presumably be found in any text-book of gynecology. Nor shall I in this connection occupy space with any reference to the relative importance of the several symptoms and signs of normal pregnancy, inasmuch as I have nothing to add on this point beyond the facts that may be found in my edition of *The Dublin Practice of Midwifery*. And, for similar considerations of economy of time and space I have also eliminated from this paper the history of several remarkable cases of spurious pregnancy which, from time to time, have come under my observation. The scope of the present brief communication precludes such exemplification of the foregoing remarks, or any allusion to other points of interest connected with the subject of pseudocyesis, my chief object now being to call the attention of junior practitioners to the frequency of cases in which the symptoms of pregnancy are either simulated or obscured by disease, as well as to the possibility of this condition being wilfully feigned in some instances.

In conclusion, therefore, I have merely to reiterate, what I am convinced by practical experience to be a much-needed word of warning as to the importance of greater caution than is sometimes exercised in answering, without sufficient knowledge, the often-asked question: "Is the person in whose case we are consulted actually pregnant or not?" On our reply to that apparently simple query may possibly depend the fair name of a girl, or the happiness of a wife, or even the life of a woman condemned to capital punishment, in whose case the plea of pregnancy may be raised in stay of execution. Issues so grave are not to be lightly regarded, or hastily disposed of; and in his decision thereon, as in all other obstetric difficulties, the practitioner's judgment should be arrived at and acted on "*nec temere, nec timide.*"

THE DISTOMA SINENSE, A RARE FORM OF THE LIVER FLUKE, WITH REPORT OF A CASE IN WHICH IT WAS FOUND.

By Hermann M. Biggs, M.D.,

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In October, 1888, in an autopsy at Charity Hospital on the body of a Chinaman, I found a rather small liver, filled with miliary gummata, and showing greatly dilated and thick-walled bile-ducts. In a casual examination there seemed to be no explanation for the dilatation of the

gall-ducts, but on more careful search for the cause, numerous small, flat lanceolate trematode worms were seen projecting here and there from the cut ends of the ducts. These appeared in large numbers with the bile when pressure was applied to the liver. They were recognized as liver flukes, and were afterward identified as a rare species of distoma (the Distoma Sinense), which has, I believe, not been observed in this country or Europe, and has only been found in a few cases in the East in Chinamen.

The history of the case was very defective, as the patient could not speak English and no Chinese interpreter was at hand. So far as could be learned, it was about as follows:

He had been an inmate of the hospital for about five months, and was suffering from a hemiplegia of the spastic type, cause unknown. There was almost complete loss of power in the left arm and leg, accompanied by considerable rigidity and irregular convulsive movements. There was only slight atrophy on this side. There had been from time to time some disturbance of the functions of the alimentary tract, associated with diarrhœa, but nothing that had attracted especial attention. Until a few days before his death he was able to use his right arm and leg, and could feed himself. He was of an exceedingly happy disposition. Two or three days before his death he developed suddenly considerable temperature, with marked pulmonary symptoms. He failed rapidly, and died with symptoms of pulmonary œdema.

The autopsy notes, in brief, were as follows:

Subject somewhat emaciated. The abdominal organs are normal in appearance, but the liver is retracted about one inch above the free border of the ribs. There are a few petechial hemorrhages underneath the surface of the pericardium. The aortic valves show lesions resulting from an old endocarditis, and on both the aortic and mitral valves are numerous vegetations produced by a recent endocarditis. The lower lobe of the right lung contains a small abscess (recent) with consolidation around it, and a spot of gangrene about one and one-fifth inches in diameter. There is also an area of consolidation involving the lower portion of the upper lobe of the left lung, and a recent pleuritis corresponding to the areas of disease in both lungs. That associated with the disease in the right lung has a fibrino-purulent exudation. The spleen is somewhat large and soft. The kidneys show lesions of an old interstitial nephritis. The liver is rather small, and is filled with an enormous number of miliary gummata. The gall-bladder is moderately dilated, and is distended with bile; and the gall-ducts, especially the smaller ones, are greatly dilated and their walls are much thickened. Pressure upon the liver after section of the organ caused the extrusion from the cut ends of the ducts of large numbers of the distoma referred to above. Forty or fifty were collected from a single longitudinal section through the liver after pressure had been applied to the organ. None were found in the gall bladder, but one was found protruding into the duodenum from the opening of the ductus communis choledochus. The stomach and intestines are normal in appearance. The dura mater and pia-arachnoid are adherent to each other for a considerable area on the right side in the motor region of the cortex. Projecting from the

membranes in this region between the fissures of the cortex are seven gummata, varying from two-fifths to three-fifths or four-fifths of an inch in diameter. These are situated directly over the motor cortical area, involving the upper portion of the left anterior and posterior central convolutions, the paracentral lobule, and the superior parietal lobule. Around this area is a quite wide zone of recent gummatous lepto-meningitis.

In the *Lancet* of August 21, 1875, Dr. J. F. P. McConnell, of Calcutta, described a new species of liver-fluke, or distoma, found by him in the dilated gall-ducts of the liver of a Chinaman. In December, 1874, Dr. William MacGregor, of Port Louis, Mauritius, also found the same species of distoma in an autopsy on a Chinaman, and described it independently in the *Glasgow Medical Journal* of May 26, 1877. The nature of these parasites was determined by T. Spencer Cobbold, and they were by him named Distoma Sinense. Leuckart afterward suggested the name Distoma Spatulatum, but the nomenclature of Cobbold has been retained by most writers on the subject.

In the cases reported by Dr. MacGregor, in which the same parasite was found in the liver as in the case reported by Dr. McConnell, there were some peculiar nervous symptoms. Dr. MacGregor says there was a peculiar form of paralysis, unlike that found in any other disease, and which, he suggests, may be due to some chemical nerve poison, produced by the parasite and then absorbed into the circulation. In the report of these cases, Dr. MacGregor says:

"When I took charge of the hospital at Mauritius there was among the patients a Chinaman who suffered from paralysis—as his diet sheet said, from abuse of opium; examination showed that the symptoms were peculiar, different from any disease generally known here. It could not be ascertained that there was any sufficient reason for supposing that his illness was induced by opium. Within the next six months eight cases of the same disease were admitted to the hospital, three of which died and five were discharged. Autopsies were performed in the fatal cases, and the parasites were always found in large numbers."

The history in these cases, as reported by Dr. MacGregor, was about as follows: In the beginning the legs and feet were somewhat swollen and painful. These symptoms were quickly followed by paralysis of the extremities. The extensor muscles were more affected than the flexors. Wrist-drop was marked. There was decided atrophy in the legs and arms, and paralysis in some of the cases was almost complete. Sensation was not affected, and there was no paralysis in the face, tongue, or sphincter muscles. The sensorium was intact. The pulse was about 110, respiration 24, temperature 99½°. Bowels were constipated. The patient gradually grew weaker, and finally died, with symptoms of œdema of the lungs. This seemed to be the immediate cause of death in each case. The spinal cord, with the roots of the spinal nerves, were removed in the fatal cases and carefully examined, and nothing abnor-

mal was detected in them; and, in the peripheral nerves and muscles, only an incipient fatty degeneration of the muscular fibre could be detected. There were no signs of lead-poisoning.

Dr. McConnell does not refer to these symptoms described by Dr. MacGregor as being present in the case reported by him, and, so far as could be ascertained, they were not present in the one here reported. The rigidity, paralysis, and convulsive movements on the left side were, of course, fully accounted for by the gummata in the motor cortical zone of the opposite side. It seems not improbable that in Dr. MacGregor's cases the parasites were accidental accompaniments of some other disease (perhaps peripheral neuritis, although it is said that no lesions were found in the peripheral nerves); this disease, whatever its nature, being the immediate cause of death.

In my case there seemed to be no evidence that the liver flukes were the cause of death. The patient evidently died of sepsis, as was shown by the history and the post-mortem lesions.

The clinical history in Dr. McConnell's case was very incomplete, as the patient was admitted to the hospital in a comatose condition, with little previous history, and died a few hours after his admission.

The following notes are extracts from Dr. McConnell's report of the autopsy:

"The lung substance was structurally healthy. One ounce of deeply yellow-tinged serum was found in the pericardial cavity; a few dark clots and fluid blood in the right chambers of the heart; the left were almost empty. The peritoneum was healthy. The liver was large, swollen, and tense; superficially of a dark-purple color, on section paler, more dingy, or muddy-looking. Its parenchyma everywhere very soft. The large portal and hepatic veins were filled with fluid blood, and the bile-ducts particularly distinct, from their large size and distention with thick yellow bile. On incising the liver in different directions, it was noticed that small dark, vermicular-looking bodies escaped on the table, and on more careful examination these were clearly seen to protrude from the bile-ducts, which, on being dissected, were found more or less obstructed by and containing them in large numbers; all were dead. The gall-bladder was full; the cystic and common bile-ducts were patent. No distomata were found in the gall-bladder, nor were any ova found on microscopical examination of the bile and the lining membrane of this sac. Numerous ova and shreds of epithelium were found in the biliary canals. (The weight of the liver after incision was fifty-four and a half ounces.) A most remarkable and intense pigmentation of the liver parenchyma was observed in microscopical sections—not mere staining, but a positive infiltration of black pigment, granular in character, and not confined or specially distributed in the inter-lobular tissue, but accompanying the hepatic cells also within the lobules. The pigment matter appeared to be biliary rather than hæmatoid. Many of the hepatic cells were also infiltrated with fat, and the nucleus in the majority was ill-defined, or altogether indistinguishable. The *spleen* was found enlarged; its capsule stretched, slightly thickened, and opaque; its substance very dark and pulpy; weight, thirteen and three-quarters ounces. The kidneys were moderately hyperæmic and dark. The small intestines were found deeply bile-stained; the large intestines were natural. The fecal contents of both, partly solid and partly liquid, were bile-colored, but no distomata were found in them, although carefully washed and examined.

"*Remarks.*—The morbid anatomy of the liver in this case seems unequivocally to point to the pressure of the flukes in its biliary duct as the exciting cause of the acute and extensive structural degeneration of the proper structure of the organ, and of that cholæmic condition induced by the obstruction of the biliary channels, which appears to have been the immediate cause of death.

"It is noticeable that the gall-bladder itself contained no distomata, nor exhibited any evidences of having been occupied by them, while the bile-ducts were found densely crowded. I must have collected at least thirty specimens in my dissection, and numbers doubtless still remained in those portions of the liver which I have preserved entire, for hardly any duct of medium size has not been found to contain two, three, or more of these parasites."

Notwithstanding the conclusion arrived at by Drs. MacGregor and McConnell that death in the cases reported by them was due directly or indirectly to these parasites, it seems to me that a careful consideration of the clinical history and *post-mortem* lesions of their cases and the one here reported forces the conclusion that the parasites and the effect produced by them are incidental and very indirectly, if at all, instrumental in the production of death. The only point in common in all these cases was the presence of the parasites in the dilated bile-ducts. Nothing in the clinical history pointed to their existence, and their presence was only discovered in the ordinary course of examination. In Dr. McConnell's case the liver was large and soft. In Dr. MacGregor's cases and in mine it was small. In all the cases the ducts were dilated. It seems to me probable that the parasites produce little more than occasionally some obstruction of the bile-ducts, with probably icterus and some mild gastro-intestinal disturbance.

The parasites in my case were somewhat larger than those described by Dr. MacGregor, and seem to have been more deeply pigmented. Otherwise they appear to be identical with those described by him, and the following description is in part taken from his paper:

The larger specimens were a little more than four-fifths of an inch in length, by about one-eighth of an inch in width, and were lanceolate in form; the anterior extremity being narrow and the posterior broad and rounded. The color varies somewhat in different individuals, being in some considerably darker than in others. The anterior and posterior extremities and the edges are of a very dark brown or almost black color. The central portion is of a dirty yellow color and has a broad dark band in its anterior half, where the uterine folds are situated. The anterior extremity has a sucker with a cup-shaped depression, which opens into a pouch (œsophageal pouch) that divides into two simple tubes which form the alimentary tract. One of these tubes extends along either side of the worm to the posterior extremity, where it terminates in a blind end. These tubes constitute the stomach and sometimes contain small granular particles. Outside of these tubes, on either side, lie the yolk-glands which occupy about two-thirds of the length of the organism. The

whole of the central portion is occupied by the organs of reproduction. On the ventral surface of the organism, a short distance back of the anterior extremity, is situated the ventral sucker. It consists of a cup-shaped depression with a circular muscular sphincter. There is a water-vascular system, consisting of a branching tube, which commences at the caudal extremity, and passing between the blind extremities of the stomach tubes, dilates a little and then proceeds onward in a slightly crooked course about as far as the junction of the anterior two-thirds with the posterior third of the organism. It then divides into two branches which it is difficult to follow, but apparently one passes to either side to the outer side of the stomach tubes. The contents are small, highly refractive particles.

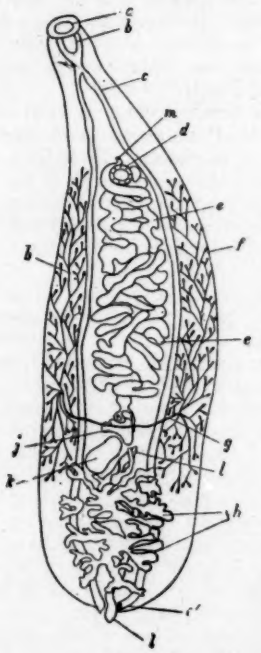
The organs concerned in reproduction occupy the greater part of the animal, and consist of the ovary, uterus and uterine pouch, testes, yolk gland ducts, and yolk-glands. The ovary is a dark, oval-shaped body, lying obliquely with regard to the long axis of the median line, from a little beyond which it extends to the stomach tube. It varies in shape and size according to its contents. Attached to the end next to the oral extremity of the animal is an irregular sacculated pouch; it would appear to contain the miniature eggs until they are sufficiently developed for extrusion into the uterus.

The ducts of the yolk-forming glands proceed straight from the uterine pouch, one to either side of the animal, and spread out into two beautifully formed pods, the yolk-glands. These yolk-glands are situated between the stomach tube and the outer edge of the animal, and extend on both sides as far forward as the ventral sucker, and as far backward as the ovary; their contents are of a dark-brown color, but after being treated for some time with a solution of caustic soda they become of a light-red color.

The uterus is a long, irregularly branched pouch, occupying nearly the whole of the central portion between the gastric tubes, and extends from the ventral sucker in front to the ovaries behind. It has a dark-brown color from the multitude of contained eggs. It opens externally at the genital orifice, just in front of the ventral sucker. The testes are situated in the posterior third of the animal between the stomach tubes. They present a beautiful dendritic appearance that varies in its details in different individuals. It is very difficult to trace the course of the vasa deferentia, but, according to Cobbold, they seem to form a common duct, which serves as an intro-mittant organ. The eggs are very small and are present in enormous numbers. They have a brown color which is due, not to the covering of the egg, but to the granules which it contains; the operculum of the egg is colorless; it is situated at one end and seems to be easily detached, as it is not seen on many eggs even before extrusion from the uterus. The secretions of the ovary, testes, and yolk-glands seem to meet in the uterine pouch and to form, by their union, a fully developed egg, which passes thence into the uterus. The outer covering of the animal is composed of a homogeneous cuticle which is reflected into the interior at the mouth of the genital orifice, and the opening of the secretory canal or water-vascular system. This outer covering presents numerous projections from its surface. Underneath it is a cellular layer and then comes a layer of muscular fibres arranged chiefly in longitudinal bundles.

Regarding the life-history of the common liver-fluke found in sheep and the manner of its entrance into the sheep's body, it seems to be about as follows:

After the escape of the eggs from their host they develop into ciliated embryos which, swimming around in the water, finally fix themselves on the surface of a snail or some similar soft-bodied water animal and bore their way into its interior. Then the embryos become transformed into *sporo-cysts*. In the sporo-cyst develops the *redia*, which has a digestive tract and an organ of locomotion. The redia escapes from the sporo-cysts and makes its way usually to the liver of the snail and there reaches its maturity. In the body of the adult redia is developed the *cercaria*. The cercaria has a tail for locomotion and by means of this it wiggles out of its host and then swims freely in the water. Finally



× 10.

a. Oral sucker.
b. Œsophageal pouch.
c. Intestinal tubes.
c'. Blind extremities of the intestinal tubes.
d. Ventral sucker.
e. Uterine folds.
f. Yolk-glands.
g. Ducts of the yolk-glands.
h. Testes.
j. Uterine pouch.
k. Ovary.
l. Water-vascular system.
m. Genital orifice.

this fixes itself on the stems or leaves of some water plant and there becomes encysted. In this condition the larvæ are swallowed by the grazing sheep.

The life-history of a typical trematode may then be summed up as follows:

1st. The egg produced sexually.
2d. The *ciliated embryo.*
3d. The *sporo-cyst,* produced asexually.
4th. The *redia,* produced asexually.
5th. The *cercaria,* produced asexually.
6th. The *adult trematode* (Leuckart).

MacGregor, acting on the supposition that the larvæ must have been taken in on some article of food peculiar to the Chinese, examined some specimens of the bêche de mer, a favorite article of diet among the Chinese, and found in them forms corresponding to both the sporo-cysts and the cercaria.

This, then, is a probable explanation of the method of introduction of the larvæ into the human subject.

The accompanying illustration, prepared with great care by my assistant, Mr. Washburn, affords a good representation of the internal structure of this organism.

58 East Twenty-fifth Street, New York.

AN INVESTIGATION INTO THE ETIOLOGY OF PHTHISIS.

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and
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IV.

On the Etiology and Local Treatment of Phthisis Pulmonalis.

By E. L. Shurly, M.D.

Following the trend of modern writings and expressions the whole subject of the etiology of phthisis pulmonalis and tuberculosis might be summed up by the statement, that these forms of disease are specific, with a specific cause, viz., the bacillus tuberculosis; every other factor being thus either swallowed up or playing a merely subsidiary part. And so dogmatic, not to say extravagant, are these numerous promulgations, that the professional mind generally has been led into this belief as a fact, that the existence of this microörganism really

comprises the whole subject of the etiology of such disease conditions. Be this so or not, it does not seem to fit into the daily clinical observations which a careful comparative study of cases might display. If the observations put forth in a previous paper be at all correct we are forced then to assume that these complex conditions of disease, commonly entitled phthisis pulmonalis, or tuberculosis, differ from each other enough to be considered entities, and cannot be justly grouped together, either clinically or etiologically upon the bacillary theory *alone*. For, there *must* be something else in operation with the bacillus, either previously or subsequently, to produce the varying features. Although the predisposing causes of phthisis pulmonalis and tuberculosis are often, according to ordinary observation, alike, or nearly so; yet, it does not follow that these conditions *are the same*, either pathologically or clinically, any more than that Bright's disease and diabetes, or rheumatic arthritis (when following similar predisponants) are the same disease.

To avoid prolixity we shall not take up the whole range of predisposing and exciting causes abounding in medical literature, but confine our discussion to heredity, contagion, and environment principally, giving an outline only of our therapeutic experiments.

Concerning the importance of "heredity," or "hereditary tendency," as an etiological factor, there seems to be more or less difference of opinion; for, while many seem to believe that its origin and spread are due to a microörganism (bacillus), and its diffusion in the several ways incident to human intercommunication, the more conservative still lay great stress upon the idea of inheritance. All, however, admit that inasmuch as we are all being constantly invaded, so to speak, by the bacillus, that some peculiar condition of the body (immunity) exists to save the majority, while some opposite condition of the body (tendency) exists in the minority to determine the selection.

Of course, the subject of immunity (both acquired and natural) has engaged the thought of the profession for many years, and yet no scientific explanation has been adduced. Likewise the laws and principles of heredity have as yet baffled discovery. Intangible, like the forces chemical affinity and electricity, we know them by their effects only; but, unfortunately, heredity, unlike the former forces, does not operate in the same manner under the same conditions (so far as we are able to judge), and we are, therefore, unable to grasp its results. This will be one of the objects of our investigation when we can succeed (as we hope to) in breeding the higher monkeys in this country. While, therefore, this lack of absolute knowledge regarding the transmission of psychical and physical traits may account for some of the discrepancy of opinion prevailing, yet we ought not to shut our eyes to the observations or the facts (disconnected though they be) concerning the transmission of disease tendencies in the human subject. This is especially true of tuberculosis,

which, as we know, will show itself through many generations, particularly in the young, requiring but the shadow of an exciting cause to incite active disease.

But, on the other hand, such a direct transmission cannot be shown strictly to operate in causing phthisis pulmonalis, for, although some families seem to show a marked tendency toward the acquisition of all sorts of catarrhal diseases, still, we often observe that several, or even many, members of such a family will entirely escape the acquirement of phthisis pulmonalis, even under considerable provocation.

There has been much discussion upon the question as arising here, and also concerning its existence as a congenital affection. Dr. Schwer, upon statistics based upon 123 autopsies of children (from 1879 to 1883), concluded that phthisis pulmonalis, or rather "tuberculosis," was not congenital, and yet he found that of this number the liver was the seat of tuberculosis in 104, the lungs in 103, the intestine in 63, the meninges in 53, and the thyroid gland in 12. It is plain that these statistics ought not to apply to phthisis pulmonalis.

The New York Board of Health, in 1886, reported that of 8540 deaths of children under one year of age 761 were reported as tuberculosis. That tuberculosis is often congenital, regardless of climate, it seems cannot be doubted by anyone who has had much experience with the diseases of children in the large cities. But the inheritance of a direct tendency to phthisis pulmonalis is extremely problematical. Dr. Landouzy (*Medical Record*, June 17, 1886) believes that congenital tuberculosis from birth to two years of age is more frequent than supposed, often not otherwise localized than as a broncho-pneumonia. Dr. Didama, on the other hand, believes, from the absence of *tubercle* in the *fœtus*, that it is not inherited. He quotes from insurance statistics many cases of phthisis, where both parents were healthy. Just what the advocates of the *purely bacillary* theory mean by *hereditary tendency* is not plain, since no particular condition or group of features is given as indicative of it, so that we are led to ask with Ruhle, of Bonn, how, by heredity, is a tubercular nidus formed in the body? We are all constantly assailed, they say, by the microörganism, but those only fall a prey who are susceptible, by virtue of some previous disease as a nidus—such as catarrhal inflammation. From this point of view, then, it must be that immunity only is inherited. However, until a proper differentiation between tuberculosis and phthisis pulmonalis is fully established, this conflict of opinion will continue. Nevertheless, we believe it is safe to say, in the light of every-day observation, that tubercular disease *is* hereditary, and, therefore, develops for the most part in a particular class of persons or animals, while phthisis pulmonalis may occur in any person living in a northern climate, after the acquisition of catarrhal inflammation of the respiratory apparatus.

Concerning the questions of "Contagion," "Inoculation," and "Infec-

tion," there is still much difference of opinion in print, although it is often asserted "nowadays" that an inoculable disease is contagious or infectious. The theory of contagion is an old belief. It was promulgated by Hippocrates and Galen. In Italy, in the middle ages, the law prescribed isolation of "consumptives." This was afterward repealed. The theory of contagion was again revived by Villemin (1865), and Klebs (1877), who found bacteria in sputum. In 1879, Musgrave Clay gave the histories of 111 cases said to have occurred by contagion. Potain, Guérin, Bernard, and others later, have given examples of similar character. In 1884, I believe, the Austrian Minister of the Interior ordered the isolation of "consumptive" patients. Cases of tubercular infection by sexual intercourse have been reported by Fernet in 1885 as examples of contagion. In this connection the experiments of M. Giboux (and repeated by other observers with varying results) are interesting. He caused one set of rabbits to inhale the air expired from phthisical patients, after it had passed through cotton-wool. At the same time he caused another lot of rabbits to inhale the expired air directly from the patients. The former lot of animals did not in any instance contract the disease, while of the latter lot each contracted it.

Dr. C. T. Williams, at the session of the British Association, 1882, from his experience at the Brompton Hospital for Consumptives, denied the spread of phthisis pulmonalis by contagion and infection. Sternberg, in 1882, and others since, failed to produce the disease in rabbits by inoculation, they even failed in some instances to find the bacillus tuberculosis. This result coincides with Dr. Gibbes's observations regarding the absence of the bacillus. Dr. Lynch, of Maryland, from a series of experiments, believes that the bacillus tuberculosis is *not* an essential factor in the production of phthisis pulmonalis. Dr. N. S. Davis, before the American Medical Association, in 1885, called attention to the *chemical facts* connected with the etiology of this disease, and questioned whether the bacillus alone was the cause of phthisis pulmonum. It has been claimed and at the same time been denied that in some animals tuberculosis or phthisis pulmonalis could be produced by inoculation with indifferent substances. Villemin, Cohnheim, Waldenburg, Burdon-Sanderson, Gutten, M. Martin, Wilson Fox, and others, have reported the production of the disease by such inoculations. But subsequent experiments by Dawson Williams were held by Wilson Fox to have disproved this.

Dr. E. L. Trudeau, in 1885, gave the results of the inoculation of rabbits with non-bacillary sputum, in which the disease, "tuberculosis," was not transmitted, as did also Dr. P. Gutten. Prof. S. Sterena, and Dr. B. Pernice, after a series of experiments upon lower animals, concluded that the liquid, after evaporation, of the sputum of phthisical patients is constantly free from bacteria, and when injected into the cornea or peritoneal cavity produces neither local nor general tuberculosis.

That phthisis-producing bacteria are not found in the surrounding atmosphere as a result of evaporating tuberculous sputum, although such organisms may be abundant therein. That respiration for several days in a close atmosphere containing tubercular sputum does not produce tuberculosis in such animals. That animals confined in close quarters and compelled to breathe an atmosphere laden with the dust of dried tubercular sputum do not contract "tuberculosis." That subcutaneous injection of tuberculous matter produces mostly local specific manifestations, as shown by the presence of bacilli in the pus from the lesion, and, after a time, produces "tuberculosis" of the abdominal or thoracic organs or "general tuberculosis." That injection in a trachea, even with a bronchial catarrh, does not cause a specific infection, but a septic croupous pneumonitis.

Again as to the question of contagion, the investigation reported by Dr. Vallien at the meeting of the Société Médicale de Hôpitaux, showing the great diversity of opinion among medical men, is interesting. He sent a list of questions to 10,000 medical men, from whom 123 answers were received. Of these, 57 believed in its contagiousness; 57 disbelieved in it; 7 doubted, and in 2 the answers were incomprehensible. Of 439 cases reported, 213 supported the hypothesis of contagion, and 226 were against it. Of the former, 107 were cases of contagion between husbands and wives; 71 near relatives; 18 were offspring of phthisical parents, and 16 were contracted from distant relatives. There are a number of cases reported of inoculation of the human subject with tuberculous matter or sputum, as for instance the case reported by Elscherung, in 1883, of a young woman who accidentally inoculated her hand while cleaning a cuspidore containing the sputum from a phthisical patient. It has been reported that the phthisis pulmonalis or "tuberculosis" has been known to have been communicated through the agency of flies.

Much more of this sort of literature could be quoted—all more or less conflicting. But enough, we think, has been presented to illustrate that probably much of this confusion of deduction arises from an improper discrimination, at times, between phthisis pulmonalis and tuberculosis.

Our experiments, as far as we have gone, seem to show that the exposure of a *healthy monkey* to the inhalation of *dried sputum* containing the bacillus tuberculosis of Koch, by means of frequent insufflations, *will produce* phthisis pulmonalis. The insufflations must be kept up, however, several times daily, for a period of about six weeks, to accomplish it. Both Dr. Gibbes and myself have also produced so-called tuberculosis in guinea-pigs by the inhalation and inoculation of indifferent substances. We have not tried this on monkeys. To test somewhat the force of contagion we have placed, in restricted quarters, *healthy* with so-called *tuberculous* monkeys without effect. The same thing has been

done with guinea-pigs, as stated by Dr. Gibbes in a former paper, with the same negative result. In the "phthisis wards" of Harper Hospital we have never been able to discover any effects due to contagion, although our microscopist, Dr. Duffield, has found bacilli tuberculosis in the air. Following the experiments of Dr. Vallien, of Paris, we have treated sputum containing bacilli with chlorine gas and sulphuretted hydrogen and then inoculated guinea-pigs with it; at the same time inoculating other guinea-pigs with some of the same sputum which had not been exposed to either of these gases, with equally fatal results, excepting the more rapid course of the disease in the latter animals. The spread of phthisis pulmonalis by the consumption of cow's milk is just now attracting considerable attention. At the recent congress of Physicians and Veterinary Physicians, held at Paris, for the discussion of the subject of "tuberculosis," many papers upon this subject were presented, varying more or less according to individual observation. The majority, however, seemed favorable to the view that cow's milk (*i. e.*, tuberculous cows) was in great part responsible for the spread of phthisis pulmonalis. We have made no experiments as yet in this direction, but expect soon to begin some by feeding monkeys principally with milk obtained from diseased cows.

It would appear, however, from observation in this country, where the consumption of cow's milk is very great, that most of the views expressed were far too radical! Whether or not so-called tuberculosis is transmitted from mother to infant through the milk, is for obvious reasons very difficult to determine. We do not, however, agree with Prof. Edouard Rengi, who states from the basis of six experiments, that mothers do not directly communicate this virus (tubercle) to children through suckling, because both Dr. Gibbes and myself have each notes of two cases of "tabes mesenterica" which undoubtedly originated in this way. My cases were those of previously healthy infants, of healthy parents, and good family history, and were suckled by *tuberculous* or rather *scrofulous* wet-nurses!

The part played by environment and its attending circumstances in the causation of phthisis pulmonalis has received considerable attention heretofore, and it will not be necessary more than to allude to it now. The accumulated experience of years points, without doubt, to the very great influence of unsalubrious habitat and occupation, together with scarcity of, or improper food, in the production of such disorders. Dr. Porter, of the Madras Medical College, reports in the *Indian Medical Gazette*, that during the famine there in 1888, in 459 consecutive autopsies, made during that time, "tubercular deposits" were found in one or both lungs in 30 men (6½ per cent.), and in 20 women (4⅓ per cent.), and 1 child. The deposits were partially in both lungs in 18 men and 16 women. The disease was latent in 18 men and 13 women.

Dr. Bowditch and others have shown by statistics the prevalence of phthisis pulmonalis in low, shady, damp places, while there is already abundant proof of the deleterious effects of unhealthy occupations and crowded institutions or workshops. These latter conditions of life are frequently cited as constituting the principal etiological factor. The experiments of Trudeau are quite illustrative of the point. He inoculated ten rabbits; five of them were allowed full liberty and good food, while the other five were confined. The five allowed to run were not diseased at the end of four months, while the others were. We have not as yet completed our experiments on this line; but, as far as we have gone, have found that unsalubrious surroundings or improper feeding will surely predispose the animal to attacks of catarrhal inflammation which lead eventually to phthisis pulmonalis. According to some authorities, such conditions of life are quite sufficient to bring about so-called tuberculosis in every instance. Others maintain, on the other hand, that such vicissitudes are but coincident or exciting causes and that a *tuberculous focus* in the body *somewhere* must have existed previously, which, under these untoward circumstances, is "lighted up." However this may be, it seems clear that the real trouble lies in an imperfect differentiation between tuberculosis and phthisis pulmonalis. Review, if you please, the mass of literature relating to the so-called surgical tuberculosis; tuberculous joints; tuberculous ulcerations of the skull, ribs, or long bones, and note how at variance with prevailing notions of pathology and clinical observation many of these statements are. We are now engaged in conducting some experiments on guinea-pigs, by inoculations of and exposure to material from so-called tuberculous joints, which thus far do not exactly coincide with modern ideas of so-called surgical tuberculosis.

Our experiments of a therapeutical character are far from completed. We are still conducting a series of experiments upon monkeys and human beings (mostly local measures), at Harper Hospital, Detroit, where we have arranged suitable inhaling rooms and other necessary apparatus, and a room for monkeys and guinea-pigs so arranged as to facilitate the handling and sequestration of these animals for our purposes. For the use of gases on the animals, we have a gas cage capable of being almost, if not quite, hermetically sealed, provided with ground stop-cocks for the ingress and egress of air or gas in any desired quantity. For the use of agents in the form of sprays, the cages are provided with shunting partitions, both perpendicularly and horizontally, and a heavy canvas flap for the front, so that we can confine an animal to a very small space if desired, and thus thoroughly expose it to the medicament. We have used thus far, sulphuretted hydrogen, chlorine gas, arseniuretted hydrogen, iodinized air, iodoform (by mechanical insufflation), chlorine water, calcium hypophosphites in solution, carbolic acid, creolin, naphthalin,

creasote, mercury bichloride, mercury biniodide, mercury cyanide, eucalyptol, turpentine, and thymol. While we have gained some knowledge from our work in this direction, it must be confessed that we have only just been introduced, as it were, to the vast field of knowledge yet to be attained.

We have made some attempts, also, to medicate monkeys by the mouth, which is very difficult, and in this connection we have to acknowledge our great indebtedness to our two assistants, Messrs. Thaddeus C. Walker and Robert Walker, for their pluck and zeal in carrying out faithfully our ideas and plans. Our experiments with sulphuretted hydrogen have shown that even in a diluted form it is highly poisonous; monkeys exposed to it while incarcerated in the gas cage, very soon and suddenly lose consciousness, falling (as if struck on the head) in convulsion. That this phenomenon occurs without any premonition is proved by the accidental experience of Mr. R. Walker, who, through an accident to the apparatus, suddenly became exposed to the gas for a very short time, and, without any feeling of premonition, dropped to the floor unconscious; the consequences of which would have been fatal but for the timely presence of Dr. Dumas, who dragged him to the open air. From my reading of medical literature I do not believe that the poisonous properties of this agent are sufficiently appreciated. Thus, some of the sudden deaths reported from the use of the "Bergeron method" of treatment, may be accounted for. May not this also account for some of the hitherto inexplicable sudden deaths reported, and vaguely attributed to other causes, such as Trousseau has alluded to? Neither Catani, Hugenschmidt, nor Nepse, who have actively advocated the use of sulphuretted hydrogen and sulphurous mineral waters by inhalation, have mentioned any particular danger of this sort. We have ascertained that this gas (sulphuretted hydrogen) is fatal to monkeys when inhaled in greater proportion, with air, than about one to five hundred for more than about three minutes.

A long series of experiments with chlorine gas as an inhalant has thus far yielded no satisfactory results. A great deal of time and labor has been expended in determining the maximum amount of gas (by volume, of course) that a monkey—either healthy or diseased—could respire, for any given length of time. We have finally ascertained that a good-sized healthy Rhesus monkey will stand the inhalation of chlorine gas mixed with air in the proportion of 1 : 3500, for about ten minutes at a time. Those suffering with phthisis pulmonalis do not bear this quantity. Exposure to the atomization of chlorine water is endured more easily, and for a greater length of time. This treatment applied to a man suffering with advanced phthisis pulmonalis caused great distress to respiration, followed by excessive expectoration.

The consequence of the use of too much chlorine, as observed in

monkeys, is increased respiration and excessive cough, vomiting, lachrymation and coryza, and if continued too long, slight convulsions. No effect upon the course of the disease has as yet been noted, except in a few instances the production of increased bronchial catarrh was sure to follow.

Iodoform, which has been so highly written and spoken of for its efficacy in so-called tubercular affections, has been used by us persistently (by means of insufflation, combined in varying proportions with starch or magnesium carbonate) in several inoculated monkeys, as also upon the human subject. In the human cases no benefit could be observed. Of the monkey cases, two were observed to have been benefited, but not saved. We observed, however, that the monkeys treated by it all showed marked evidence of fatty degeneration of the liver.

Arseniuretted hydrogen was used in one instance only. It was pumped —mixed with air—into the gas cage. It effects were so baneful—causing great distress, nausea, vomiting, and diarrhœa—that it was abandoned. This agent is so dangerous to all animal life that further experiment with it will be postponed until we can obtain safer facilities for its manufacture and manipulation.

Mercury bichloride has been used by inhalation quite extensively, both upon monkeys and in the wards of Harper Hospital, with very promising results. With those cases possessing a syphilitic taint this agent has proved quite efficacious. We use from one-half to one or two ounces of a solution 1 : 3000, for each inhalation in the form of spray.

Mercury biniodide has also given good results when used as an inhalation, in the same proportion as the bichloride, especially in cases of laryngeal phthisis in the early stages. In two or three cases its constitutional effects (diarrhœa and epigastric distress) were observed.

Creasote has shown no particularly good effects, except in destroying the fetid odor arising from a certain class of cases. Neither has turpentine, either alone or in combination with thymol or eucalyptus, proved efficacious, except in cases of simple bronchial catarrh. The same may be said of either eucalyptus or thymol when used alone.

Carbolic acid used as spray, incorporated with petroleum oil, has seemed beneficial in the subacute and chronic forms of phthisis pulmonalis; but, on account of the difficulty of keeping it constantly and thoroughly suspended, it has been abandoned for creolin, which is, from present indications, far superior in its effects and more easily adapted to inhaling purposes.

Hypophosphite of calcium is showing itself to be of decided benefit in the local treatment of the chronic forms of phthisis pulmonum. We are in hopes of being able to report excellent results from it in the future.

The plan of extra-alimentation by forced feeding has not as yet

received much of our attention. We hope, however, to try it with some inoculated monkeys. We are still experimenting with these and other agents, by their local use, and as soon as possible intend to test more thoroughly the qualities and effects of calcium sulphide, salicylic acid, boracic acid, etc., both locally and by internal administration.

A CASE IN WHICH CEREBRAL LOCALIZATION WAS ILLUSTRATED BY THE EFFECT OF MENTAL IMPRESSION.

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Mr. I. consulted me about three years ago for a condition of the right wrist and hand, from which he had suffered for several years, and which resembled writer's cramp, but differed from that affection etiologically, and in that the condition was one of tremor rather than of spasm. It was not the result of any special or excessive use of the hand, and was associated with a slight degree of paresis of the right leg.

There was a good deal of occipital pain, which I found to be dependent upon defective action of the ocular muscles. This was completely relieved by prisms selected by Dr. Noyes. Singularly, not only was the pain relieved by the use of the glasses, but the condition of the hand and leg was considerably improved.

As a great variety of treatment had been tried before I saw the patient, and he had suffered much of many physicians, specialists included, I now advised him to rest content with the measure of relief he had obtained, and to desist from further treatment, diverting his mind as much as possible from his condition by active employment.

Pursuing this course he has gotten on in the main very well up to the present time. His general health has improved, and the hand and leg are decidedly better. He is, however, still obliged to write with his left hand, although the right is fairly useful for other purposes.

This was his condition when, a few days ago, he became interested in reading the article in *Harper's Magazine* for May, in which Mr. Chittenden describes his experience in signing, as Register of the Treasury, 12,500 United States bonds in sixty-four hours, and the physical distress which the effort occasioned. As he progressed in the reading Mr. I. experienced a severe pain, beginning in the right hand, running up the arm into the neck, then into the occiput, and at last settling with great intensity in a circumscribed spot on the left side of the head. In describing this pain to me he indicated with his finger as accurately as I

could possibly have done the exact situation of the postero-parietal convolution in which Ferrier locates the centre for the wrist and hand of the opposite side. Some pain was also experienced in the leg.

Now, this gentleman had no knowledge whatever of cerebral localization beyond the broad fact that the brain on one side actuates the muscles on the other. The pain he described could not, therefore, have been the result of suggestion. The conclusion seems inevitable that the phenomena in the hand and leg had back of them a morbid condition of the cortical centre, and that this morbid condition was in such wise influenced by the direction of the mind toward the function of that centre as to express itself in pain. Probably the intermediate link between the mental action and the production of the pain was a vaso-motor disturbance.

Experiments, especially those of Amidon, indicate that functional activity of a cortical centre may give rise to an appreciable increase of the local temperature. This observation, however, would seem to show that merely occupying the imagination with a function may excite a degree of disturbance in the centre corresponding to that function.

From a diagnostic point of view, the attack of pain so strangely elicited is important as confirming a cortical origin of the symptoms. From the implication of the leg it is probable that the posterior portion of the convolution was also involved.

If we accept Ferrier's earlier conclusions as to the function of the angular gyrus in relation to the movements of the eyes, we find in the proximity of this gyrus to the postero-parietal convolution a probable explanation of the improvement in the hand and leg when the eye-strain was relieved. The more recent views, however, as to the location of the centre for ocular movements, remove it so far from this region that this explanation scarcely seems tenable.

ATTEMPTED SUICIDE BY HYDROCYANIC ACID POISONING. RECOVERY AFTER THE INGESTION OF HALF AN OUNCE OF THE OFFICINAL SOLUTION.

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Through the courtesy of Dr. W. Gilman Thompson, attending physician to the Presbyterian Hospital, I am enabled to report the following case of hydrocyanic acid poisoning, in which it is believed a larger quantity was taken than in any previously recorded terminating in recovery. The case is also somewhat unique in the exceptionally favorable conditions present for the observation of symptoms:

E. H., a student of pharmacy, æt. twenty-two, was found unconscious in Central Park about four o'clock in the afternoon of April 12th. When

first seen he was half sitting, half reclining, on a bench, with his head extended over its back, with eyes upturned and limbs relaxed. He had vomited about a teaspoonful of greenish material. Efforts to arouse him were unsuccessful. He was removed to the Presbyterian Hospital, and as he was lifted into the ambulance a slight clonic convulsion was observed.

On admission the patient was unconscious, pupils widely dilated, the right a little more so than the left; pulse 86, small and compressible; respirations shallow, sighing and ranging between forty and fifty a minute. There was conjugate deviation of optic axes outward. There was no cyanosis. The face, on the contrary, was of a warm, rosy tint but the surface was cold; temperature *per rectum* 97½°. A faint odor resembling bitter almonds was detected in the patient's breath, which suggested prussic acid poisoning, and a search of the pockets was rewarded by finding a half-emptied, glass-stopped ounce vial of the officinal dilute hydrocyanic acid, bearing the label of Powers & Weightman. The gastric siphon was passed and the diagnosis further confirmed by testing the first washings, which were mixed with considerable partially digested food, and smelled strongly of prussic acid. On treating with solutions of ferrous chloride and ferric sulphate, and then with potassium carbonate, a characteristic precipitate of prussian blue was obtained.

At first the patient responded with slight movements when pinched, but the coma soon deepened into complete insensibility with abolition of reflexes. The pulse rapidly ran up to 112, and became thready and irregular in force and frequency. The impulse of the apex beat was expansile and vibratory; the heart's action was labored and tumultuous. The patient breathed badly, and death appeared impending. Although the dyspnœa was extreme, there was no pallor of the mucous membranes or lividity, the color continuing of the same bright arterial hue throughout. There was decided trismus, rendering the introduction of the stomach tube difficult, and for a brief space there was rigidity of the limbs. At the same time involuntary escape of the urine was noted.

Lavage of the stomach was persisted in until the washings were perfectly clear and the odor of the poison could no longer be detected. From the first the patient was promptly stimulated hypodermatically with whiskey, camphorated ether, strychninæ sulphas gr. $\frac{1}{40}$ and atropinæ sulphas gr. $\frac{1}{80}$. *Per orem* he received in divided doses two ounces of whiskey and three drachms of aromatic spirits of ammonia in hot water. A stimulating enema of three ounces of whiskey and two ounces of hot water was administered. Dry heat was applied locally to the entire surface of the body and a hot-water bag was placed over the præcordium. Within twenty minutes the pulse, which had become alarmingly weak and irregular, began to revive, the impulses becoming fuller and stronger and their frequency diminishing. There was a corresponding improvement in the respirations and slight movements of the voluntary muscles could be elicited. The faradic current, which had been applied with one pole at the base of the neck over the situation of the pneumogastric and phrenic nerves, the other over the superficial cardiac area and epigastrium, appeared of benefit in maintaining both the heart and respiration. The patient manifested no sign of returning conciousness for two hours, but was out of danger within an hour after his admission.

Two ounces of pale, limpid urine, withdrawn by catheter, possessed the odor of the poison and gave a well-marked blue precipitate with ferric and ferrous salts. The reaction was acid, specific gravity 1017. Small, octahedral crystals of calcium oxalate were present. On applying heat

and nitric acid twenty per cent. of albumin by bulk was thrown down. With Fehling's test for glucose a heavy, ochre precipitate was obtained.

On evening rounds at 7.30 P.M., the pulse was 108, respirations 28, temperature 98.5°. He had fully recovered and conversed freely. Family trouble and a morbid dread of failure in an approaching examination were the causes assigned for his act. He stated that his first sensation after swallowing the acid was a feeling of numbness and anæsthesia of the lips, quickly followed by shortness of breath and loss of consciousness. There was no feeling of constriction in the throat or burning sensation in the stomach. He experienced no nausea and does not remember having vomited.

During the evening there were several loose fecal movements, the first of which was streaked with blood. The urine passed during the night was amber in color; specific gravity 1020, reaction acid. On testing, it no longer reacted with Fehling's solution and the albumin was found reduced to three per cent. The reaction for prussic acid could not be obtained. Beside the albumin there were other evidences of a mild degree of acute, exudative nephritis in the presence of hyaline casts, leucocytes and renal epithelium. The microscope showed numerous dumb-bell crystals of oxalate of calcium. The urine of the morning of the 14th was found perfectly normal. On the 13th and 14th patient had a temperature ranging between 99 8° and 100½° and complained of weakness and want of appetite. On the 15th he was discharged cured.

In this case rather more than half an ounce of the fresh officinal solution was swallowed, an amount equivalent to four and eight-tenths grains of the anhydrous acid. This is double the quantity taken in the case reported by Burman (*Lancet*, January 14, 1854), which, up to the present time, has been quoted as the largest dose recovered from. Christison (*Edinburgh Monthly Journal*, February, 1850, page 97) reports a case of recovery after the ingestion of a grain and a half of the pure acid. These two are the largest recorded cases of recovery that I have found. Of interest, as showing the smallness of the dose which is sometimes fatal, Garstang (*Lancet*, 1888, vol. ii. page 15) reports a case in which death followed a single dose of half a drachm of the two per cent. solution of the British Pharmacopœia. Woodman and Tidy report twenty-six cases, all but six of which were fatal. Of these, the smallest lethal dose was nine-tenths of a grain.

In the case here reported, the strength of the acid was tested by experiment on kittens. Two drops of the portion remaining in the bottle found on the patient's person, caused death in two and a half minutes when placed upon the tongue of a healthy kitten. The animal emitted a few sharp cries and was seized with dyspnœa and clonic convulsions. Death was preceded by a brief tonic spasm and evacuation of urine and feces. In the *Revue Médicale* (February, 1845, vol. i. page 265) a case is reported in which the urine was scanty in amount for four days after recovery from the immediate effects of the poison. The effects of hydrocyanic acid and its derivatives in producing temporary glycosuria are well known, but the other urinary changes noted in this case, viz.:

the occurrence of albuminuria, casts, leucocytes, desquamated renal epithelium, and oxalate of lime crystals are, so far as I know, here observed for the first time. The elimination of the drug through the kidneys renders a transient acute nephritis one of the lesions which might naturally be expected, and it is thus highly desirable that in cases of poisoning the condition of the urine should be examined to ascertain whether or not these changes are constant.

Various theories as to the toxic action of hydrocyanic acid have been proposed. The phenomena observed in this case would appear to support the view of Hoppe-Seyler (*Archiv für patholog. Anatomie*, Band xxxviii. page 435) and Preyer (*Die Blausäure physiolog. Untersuch.*, Bonn, 1870) that the acid induces a change in the hæmoglobin of the blood, forming a compound cyan-hæmoglobin, differing from oxy-hæmoglobin in that the oxygen is in stable combination, thus preventing the oxygenation of the tissues and possibly also retarding the elimination of carbon dioxide. This would explain the occurrence of all the symptoms of asphyxia without the supervention of cyanosis. The effect on respiration, however, is not to be considered entirely due to these blood-changes, but also to an action on the respiratory centre in the medulla, as death is produced much more rapidly when the poison is applied directly to the medulla of an animal than when the same quantity is administered by the mouth.

There would also appear to be a direct action on the motor ganglia of the heart and fibres of the vagus, producing a speedy paralysis of the heart's action, out of all proportion to that which would be looked for in ordinary asphyxia. Brunton has shown that the direct application of hydrocyanic acid to the heart of a frog arrests its pulsations, and is followed by a rapid loss of muscular irritability. On voluntary muscles and the peripheral fibres of motor nerves hydrocyanic acid is also a paralyzant, as has been well shown by von Kiedrowski and Reichert in their experiments on the crural muscles and nerves of the frog. On sensory nerves its anæsthetic effect is marked.

As regards treatment, the exhibition of ferrous and ferric salts in the presence of an alkali resulting in the production of insoluble prussian blue would seem to be a rational chemical antidote. The poison, however, is so rapidly absorbed that this is rarely practicable, and after emptying the stomach by thorough lavage it only remains to combat symptoms by vigorous stimulation, warmth, and the use of the faradic current. Cold affusion and artificial respiration appear to have been of benefit in some cases. The indication for the former is doubtful in view of the depressed bodily temperature usually present. The elimination of the acid in the urine, which was conclusively demonstrated in this case, would suggest catheterization as a precaution against a possible reabsorption, as the poison is readily taken up from mucous membranes.

REVIEWS.

DIE FRAGE DES UEBERGANGES GUTARTIGER KEHLKOPFGESCHWÜLSTE IN BÖSARTIGE, SPECIELL NACH INTRALARYNGEALEN OPERATIONEN. Von DR. FELIX SEMON, London. 8vo., pp. 194. Berlin: August Hirschwald, 1889.

THE QUESTION OF TRANSFORMATION OF BENIGN LARYNGEAL GROWTHS INTO MALIGN ONES, ESPECIALLY AFTER INTRALARYNGEAL OPERATIONS. By DR. FELIX SEMON.

DISBELIEVING an opinion, expressed by some observers, that morbid growths of the larynx were liable to transformation into malign growths, Dr. Semon, the editor of the *Internationalen Centralblatt für Laryngologie, etc.*, determined to study the subject accurately from the collective experience of as many physicians as he could enlist in a series of inquiries which were addressed to all known laryngologists in every portion of the globe. From most of them he obtained replies concerning certain important details in all the cases of morbid growths of the larynx which had come under their professional care. The results derived from the study of these reports, and of certain comments accompanying many of them, have appeared in successive issues of the periodical so ably edited by Dr. Semon, and are now presented connectedly in a reprint. It is almost needless to mention that the pathogenetic significance of this study is not limited to the larynx, but is applicable to the question of presumptive transformations at large. The cases presented in favor of transformation are recorded in sufficient detail. They have been closely scrutinized with intelligent impartiality, and great pains have been taken to eliminate from their histories whatever features appeared to be at all obscure or misleading. The reasons for each elimination are plainly stated in the appropriate connection. The result of the entire investigation, while confirming the views which had prompted the inquiry, has been far more positive than could have been anticipated; and is a new revelation to many laryngologists, certainly to the writer of this notice.

We present in abstract the conclusions that have been derived, and refer those especially interested to the volume itself for the data and the arguments from which they have been drawn.

Two questions were formulated in the summary:

Is transformation of benign laryngeal growths frequent, especially after intralaryngeal operation?

Can the intralaryngeal operation itself be held accountable for any such transformation?

The first question Semon answers negatively in the most emphatic manner. Such transformations have been reported in but 45 cases out of 10,747; spontaneous in 12 instances; after intralaryngeal operations

in 33. These 33 cases occurred out of a total of 8216 cases submitted to operation, or 1 in 259. Only 5 of them, however, are deemed to be undoubted, or nearly undoubted, instances of transformation; a proportion of 1 in 1645. Seven of them are allowed to be probable instances, and if these be included the proportion would be 1 in 685. If several cases deemed doubtful be added to the list, the entire proportion would be 22 : 8216, or but 1 : 373. Consequently, Semon sees no escape from recognizing the fact that the transformation in question is an extremely rare occurrence.

A negative answer to the second question follows as a natural corollary of the negative answer to the first one. Nevertheless, Semon discusses the objections that might be made to such a deduction, for the purpose of displaying their feebleness. He cites a number of instances of repeated and of prolonged operations, some of the cases having extended over a series of years, in which the benign character of the growths has continued unchanged to the very last, and presents them as proof that operative interference has no tendency to render a benign growth malignant. He attributes much of the apparent transformation to malignancy, to actual malignancy, or at least to mixed characteristics from the onset. Furthermore, comparing the instances given of spontaneous degeneration and of degeneration after intralaryngeal operation, he points out that the former occurred in 12 instances out of 2531, or 1 : 211, while the latter occurred in 33 out of 8216, or 1 : 249; so that actually, spontaneous degeneration is rather more frequent in untouched cases than is post-operative degeneration in cases interfered with. Consequently, he is forced to the conclusion that intralaryngeal operations can exert no influence which will transform a benign growth into a malignant one.

Attention is called to some important clinical and pathological features which have become apparent during the course of this investigation. The study has shown that carcinoma frequently begins in the vocal bands, and that malignant growths may present the complete laryngoscopic aspect of benign neoplasms, sometimes to the very termination of the case. It has shown the unreliability of dependence upon the negative results of microscopic examinations of fragments of growth removed endolaryngeally, especially as regards the varieties of mixed growths; and it has thus shifted the responsibility of the diagnosis, in early and doubtful cases, from the pathologist to the clinician.

The labor which has been bestowed upon this collective investigation, one, too, which has been carried out with scientific caution and precaution, has been immense, and can be fairly appreciated only by those who peruse the text, and have some personal familiarity with statistical work and with the difficulty of drawing proper deductions therefrom. The different subjects of clinical and of pathological interest have been discussed with great fairness. The arguments advanced in their discussion are arrayed logically and systematically. The task undertaken by Dr. Semon has been difficult, and it has been executed in a masterly manner. The lesson taught is a most important one; and laryngological literature and therapy will feel its influence for a long time to come.

J. S. C.

LECTURES ON BRIGHT'S DISEASE. By ROBERT SAUNDBY, M.D. Edin., Lond.; Physician to the General Hospital; Consulting Physician to the Eye Hospital, and Consulting Physician to the Hospital for Diseases of Women in Birmingham, etc. With 50 illustrations. 8vo., pp. vi., 290. Bristol: John Wright & Co., 1889.

THE author disclaims in the preface to these excellent lectures, "all pretensions to have said the last word on the many vexed questions" discussed. He has "endeavored to explain within a modest compass the present state of contemporary knowledge, making such additions and suggestions as have resulted from thirteen years' clinical and pathological study of Bright's disease. Some of the material has been previously published, but every chapter has been re-written and every point has been thought out again." The special feature of the work is the collation and comparison of the various theories advanced to explain the morbid phenomena discussed; with critical discussion of the evidence, clinical, pathological, and experimental, upon which these theories are based; and finally a judicial deliverance representing the author's opinion.

The volume is divided into three sections, entitled respectively General Pathology, Clinical Examination of the Urine, and Bright's Disease; the sections being subdivided into appropriate chapters. Bibliographical references follow each chapter, and there is a good general index.

Albuminuria is defined as the presence in the urine of serum-albumin or serum-globulin or their modifications, syntonin and alkali-albumin. The number and variety of the pathological relations in which albumin may appear in the urine, compel us, in the author's opinion, to regard it as dependent not only upon inflammation and grave congestion and other coarse organic changes, but upon slight variations in the mechanical conditions affecting the circulation of the kidney. All these states he would arrange in the following groups:

1. Congestions of the kidney; which may be active or arterial, passive or venous.
2. Inflammation, acute or chronic; which occurs in many inflammatory, zymotic and specific diseases, in gout, in lead-poisoning, etc.
3. New-growths.
4. Degenerations; especially lardaceous degeneration of the renal arterioles.
5. Alterations in the composition of the blood; as in purpura, in scurvy, and in attacks of paroxysmal hæmoglobinuria.

Looked at in this way, the author believes that the difficulties which have beset the discussion of the significance of albuminuria melt away; this result being attained by the absolute surrender of the doctrine that albuminuria signifies Bright's disease, and the acceptance of the view that it is simply the admixture with the urine of albumin diffusing from the blood serum. Saundby does not contend that there is no departure from the normal mechanism of the renal circulation in those cases of albuminuria which Grainger Stewart and others term "physiological" or "functional," but he considers it certain that neither this lesion nor the loss of albumin gives rise to any derangement of health which impairs the working capacity of the individual or tends to shorten his life.

The conclusion from this doctrine is, that there are cases of albuminuria which not only do not require medical treatment, but may be safely accepted by life assurance companies. In these cases the urine is normal in every other respect, there are no tube-casts, the amount of solid matter excreted is sufficient, and there are no signs of cardiac hypertrophy or of high arterial tension, no renal changes, no œdema. Moxon in 1876 described two forms of latent albuminuria; the "albuminuria of adolescence" and "remittent albuminuria," which Pavy has recently re-named "cyclical albuminuria." The author believes the latter to be clearly dependent upon the erect posture. It seems as if in the early part of the day the circulation in the kidney could not establish a proper equilibrium, but that in a certain number of hours this is attained and no more albumin is lost until after rising the next morning. He cites some cases of benign albuminuria which he has been able to keep under observation for a series of years and in which organic disease has not developed; and gives it as his matured conclusion that albuminuria may occur in dyspeptics and in weakly, overgrown persons without being an indication of actual or potential disease of the kidney. After full discussion of the various theories of the causation of this symptom, he reconciles many of them by accepting each in turn as applicable to certain instances; and concludes that its various causes may be grouped under three headings, as follows:

1. Hæmatogenous; the albuminuria being due to alterations in the diffusibility of the blood albuminoids, owing to changes in the salts of the blood or in the alkalinity of the blood serum.

2. Parenchymatous; inflammatory changes in the epithelium giving rise in the first instance to an albuminous exudate which must be present in the urine, and secondly by destroying the cell layer and altering the basement membrane, allowing direct transudation from the lymphatic spaces into the tubules.

3. Vascular; the walls of the glomeruli probably undergoing alterations of their permeability from the effects of poisons, inflammation, and vasomotor paralysis, while lowering of the blood-pressure and slowing of the blood-current favor filtration of albumin through them.

The cardio-vascular changes the author believes to be, next to dropsy and the state of the urine, the most striking clinical and pathological phenomena met with in Bright's disease. Clinically they are present in cardiac hypertrophy with increased arterial tension, and pathologically the changes described are hypertrophy of the heart and thickening of the small arteries. The author discusses the well-known theories of Traube, of Johnson, of Gull and Sutton, and also that of Buhl. He considers that the cardiac hypertrophy is due first to stimulation of the heart by the presence in the blood of toxic matter due to faulty elimination, and second to increased capillary resistance due to alterations in the density of the blood-plasma. The high-tension pulse is ascribed to the same causes. Uræmia, too, is regarded as being dependent upon certain toxic agents arising or accumulating in the blood, which at present have not been identified with certainty. Stress is rightly laid upon the fact that failure of intestinal action is a grave additional feature; as elimination may take place through this channel when the renal function is depressed.

The question of therapeutic interference with a diarrhœa occurring

in the late stages of chronic contracting kidney is one which cannot be readily decided. On the one hand, we have met with cases, in which uræmia has seemed to be the direct result of the administration of opium in cases of this kind, where the renal lesion had not been recognized and the diagnosis of chronic diarrhœa had been made. On the other hand, the discharge may be exhausting. Evidently no universal rule can be formulated, but each case must be studied for individual indications.

The section on "Clinical Examination of the Urine," is quite full and reliable. The test for albumin which the author prefers is that made by boiling the upper half of the liquid in the test tube, and adding a few drops of dilute acetic acid. Next to this he places Heller's ring test. Picric acid he does not consider as delicate as either of the two above mentioned.

The different forms of Bright's disease are classified by Saundby upon an etiological basis, under the respective heads of Febrile Nephritis, Toxæmic Nephritis, and Obstructive Nephritis. These terms are self-explanatory. Pathologically, the first division includes cases of acute parenchymatous nephritis and of chronic fatty kidney. The second division is especially associated with the small red granular kidney, and in particular with that form due to lithæmia. It includes the acute nephritis of acute gout and poisoning by animal, vegetable, or mineral poisons, and certain cases of primary acute nephritis usually attributed to chill, but in which there is probably already existing dyscrasia. Such cases are met with occasionally in persons who get drunk on beer and lie out all night. In each of these classes we may meet with the urinary and other symptoms of acute or chronic nephritis, while the post-mortem appearances may be those of acute nephritis, of chronic degenerating kidney or of contracted kidney. While this classification will aid in simplifying the study of the various affections which are included under the general name of Bright's Disease, we doubt whether it will receive general acceptance either by clinicians or pathologists. Unsatisfactory as is the commonly received classification it has the advantage of presupposing the least, of all systems which have yet been proposed; and must, therefore, remain the least objectionable, until better knowledge shall permit us to make an accurate classification.

Saundby's recommendations as to the treatment of the various forms of the disease are judicious and in line with the generally received opinion. We are glad to note that he does not approve of exclusive milk diet in gouty cases. The following will bear quoting: "If a patient suffering from chronic Bright's disease is in fair general health, and the discovery of a lesion has been made more or less by accident, so to speak, we should be careful to do nothing that will worsen his condition by over-vigorous treatment or too severe regimen, but should be content to relieve the symptoms of which he complains, if it is in our power to do so, while at the same time we endeavor to regulate his habits and mode of life in conformity with principles deduced from our knowledge of the etiology and pathology of his disease." All in all, the book is a valuable addition to the literature of its subject. S. S. C.

OUTLINES OF THE HISTORY OF MEDICINE AND THE MEDICAL PROFESSION. By JOH. HERMANN BAAS, M.D. Translated, and in conjunction with the author revised and enlarged, by H. E. HANDERSON, M.A., M.D. 8vo., pp. vi., 1173. New York: J. H. Vail & Co., 1889.

AMERICA'S contributions to the literary history of medicine have been but few. Aside from Thacher's *Medical Biography* (1828), the translation of *Renouard's History*, by Comegys (1856), and the compilation by Dunglison (1872), we have been able to boast the production of little more relating to the history of medicine than short addresses and isolated papers of limited scope.

This apparent slowness in the cultivation of what may be called a refinement of medicine is not surprising. Many limitations inevitably surround the prosecution of nearly every branch of literature in a new country. Scarcity of libraries, non-endowment of universities by the State, the dependence of everyone for subsistence upon his own exertions, and the almost universal admiration of financial success, have all tended in this country to keep unpractical accomplishments in the background, and it must be admitted that the history of medicine has been regarded as little better than useless.

Such harsh opinion of the usefulness of study of the history of medicine we believe to be unjust. Correct estimate of the advantages to be gained from the study of history is always difficult. To none is this more difficult than to the busy practising physician, to whom ability to meet the ever-arising exigencies of the present is of such transcendent importance as to render him careless of matters not offering immediate return in that direction. But during the past half century exact methods of diagnosis, dependent upon physical and chemical laws, control of experience by facts deducible from careful study of anatomy, physiology, and pathology, and experimental investigation of the action of drugs, have elevated medicine from the position of a useful art to the dignity of a science. As such it must be dependent for further development in great part upon the results of careful investigation. Fortunately the more complete division of labor, and the increase of wealth which have accompanied this advance, afford time and facilities for the prosecution of experimental studies by a host of investigators equipped with all the appliances of modern science. In his study the investigator often receives material aid from an acquaintance with the work of his predecessors. It stimulates ambition, offers valuable suggestion and direction of both plan and scope of his experiment, affords encouragement to renewed effort in times of disappointment, and sets before him the example of men who have attained eminence as the result of their desire to extend the usefulness of medicine. Who can fail of profit from the contemplation of the quiet perseverance of a Harvey, or a Jenner, or a Darwin, or a Koch?

Hitherto the study of the history of medicine has been prosecuted more particularly by the Germans. The exhaustive works of Sprengel. Hecker, Isensee, Choulant, Hirsch, and Haeser, are familiar to everyone, In 1876 appeared the *Grundriss der Geschichte der Medicin und des heilenden Standes*, of Dr. Baas, an important addition to the literature of this subject. It is now our agreeable duty to call attention to a translation of this work into English, by Dr. Handerson, of Cleveland,

to whose enthusiastic energy are due many additions, more especially relative to medicine in this country and England. The author, too, has very materially co-operated with the translator in placing at his disposal his notes for a second German edition. The number of these additions may be inferred from the fact that the book has grown in size by nearly one-half.

Following the lead of universal history, the author has attempted to trace the development of the medical profession as a whole, rather than restrict himself to detailed biographies of its greater lights. Accordingly, we find much space devoted to description of the position in the community occupied by the physician in times past; his opportunities for education, the respect accorded him by the laity, the restrictions imposed upon him by law, his mode of living, his fees, and his relations with his professional brethren.

In the sixteenth century we find the northern student making his way over the Alps into sunny Italy to attend lectures at Padua, or Pisa, or Bologna; we find him voting for the rector of the university, and having a voice in the regulation of the curriculum; we find him living a lawless life, often drinking immoderately, and careless of property. Tired of one school he joins himself to a band of travelling scholars, singing from door to door, begging food and lodging for the night, until the attraction of some celebrated professor again for a time binds him to a fixed abode. Nor are the students alone in their nomadic life. Professors are often of their number, and few physicians have any settled home.

Anatomy is breaking away from the dogmas of Galen, under the lead of Vesalius, Fabricius, and Fallopius. Montanus is drawing crowds to Padua to witness the first clinical lectures in Europe. But the works of Galen and Avicenna, and the aphorisms of Hippocrates, are still the encyclopædias of medical knowledge, their literary criticism continuing to occupy a large part of the time of the learned professors.

The physician is often, also, alchemist and astrologer. His fees are small, from 8 to 40 cents a visit, according to the means of his patient, and his practice is usually limited, unless he be widely known, so that we find him often driving a trade, in addition to his practice, to eke out a livelihood. On this account he commands little respect from the laity. Uroscopy is the order of the day, and this and the treatment of syphilis often bring him substantial return. Surgery is in the hands of the barbers, owing to papal injunctions upon its practice by the better educated, though in 1579 we find the Pope licensing its practice by physicians in France by special indulgence.

The seventeenth century finds his condition improved. Scientific zeal has been great'y stimulated by the study of anatomy and by the discovery of the circulation. Alchemy, though still in vogue, is giving place to chemistry and natural philosophy. Hippocrates, Galen and Avicenna continue to furnish the creed of the physician, who still keeps himself aloof from the surgeon. Clinical instruction is becoming more and more popular, and as universities spring up in northern Europe emigration to Italy becomes less common. Anatomy is attracting the attention of the laity, and we find them flocking to the anatomical theatre to witness dissections by the celebrated professors, which, however, are still seldom permitted. Learned societies begin to spring into existence,

and with them a greater diffusion of knowledge as books become more numerous.

Toward the end of this century no graver or more dignified person is to be seen than the "*medicus purus*," or physician proper, dressed in his fur-trimmed robe and peruke, with cane in hand and sword at belt. His fees are not materially larger, but with increased respect from the community has come a larger practice, and we find him more comfortable. In this century, too, we find the practice of obstetrics, which has for several centuries been carried on almost exclusively by midwives, coming into the hands of the physician.

In the eighteenth century we see only increased dignity in the position of the physician. He is at the zenith of his fame. Powerful in the community as the exponent of science in all its branches, and beloved as a kind friend and helper in disease, he has never before, and only occasionally since, attained to such universal respect. Boerhaave, van Swieten, Haller, de Haen, Frank, Hunter, in northern Europe, and Morgagni, in Italy, command a degree of homage for their profession unexampled in the annals of any other secular calling.

Legal restrictions begin to limit the practice of medicine to those specially prepared for it. Alchemy and astrology give place to science. Anatomy, physiology, and pathology are greatly advanced. Clinics find establishment in nearly all the university towns of northern Europe, and by the end of the century surgery has been elevated to equality with medicine.

But what need of going further? Within the narrow limits of a review any adequate description of this most interesting development is impossible. We can only hope to impress upon the reader the usefulness of the book to every investigator as affording him encouragement and a key to the literature of medicine in times past. To those less interested in the advancement of their chosen calling it offers pleasant reading for a leisure hour, and stimulus in the example of their predecessors to attempt something for the improvement of the noblest of professions.

J. S. E.

CYCLOPÆDIA OF THE DISEASES OF CHILDREN, MEDICAL AND SURGICAL. THE ARTICLES WRITTEN ESPECIALLY FOR THE WORK BY AMERICAN, BRITISH, AND CANADIAN AUTHORS. Edited by JOHN M. KEATING, M.D. Vol. III. Illustrated. 8vo., pp. xv., 1371. Philadelphia: J. B. Lippincott Co., 1890.

THE third volume of this great work now lies before us, and, upon the whole, it has fulfilled the promises made by the other two. Much more than one-half of the large volume is given over to the surgery of children, and seems to be the fullest discussion of this branch since the appearance of Saint-Germain's book. Among the authors we find such names as Fenger, Senn, Vander Veer, Kelly, Ketch, Bradford, Macewen, Gibney, Gerster, and others—sufficient guarantee for the excellence of the articles. Among the medical articles are found some of very great value; the article on the Blood, by Crozer Griffith, although diffuse, can be picked out as especially important. Unfortunately a greater part of it

applies to adult life, and therefore its diffuseness. How dangerous the innate desire for thoroughness becomes is seen in the article by Senn; he devotes nearly two pages to the description of Acute Pancreatitis, of which he says that "only a few well-authenticated cases of this disease have been reported, and none of the patients were children." In the discussion of the physiology of the pancreas, to which he devotes over three pages, he has studied Herman, Heidenhain, and Schiff; he even records the beautiful case of Busch; but he does not mention Korowin and Zweifel, whose researches are of the highest importance, indeed making the digestion by the pancreas a characteristic act in infants. Among the other medical articles, Holt's deserves especial mention, containing much that is original and discussing the whole subject in an impartial manner, which is in decided and pleasing contrast with most of the articles we are in the habit of reading. The articles by Hare, Edwards, and Jacobi show much thought and good, patient research, while the one of Booker is the result of original investigation on a subject so very important, but still so far in the distance. The papers on the Liver, by Chapin, Musser, and Hatfield, are very interesting; it is a pity that Chapin did not expand the subject of functional troubles more, as it is capable of bringing up many interesting physiological and pathological questions. The article on "Albuminuria," by Tyson, is brief but excellently put: we miss a description of that condition so common in children, the so-called renal inadequacy. The illustrations are better than the average, and some of the process reproductions are excellent. Most of the woodcuts, however, are not beautiful, from an æsthetic standpoint, notwithstanding their possible value from the surgeon's point of view. F. F

HISTORY AND PATHOLOGY OF VACCINATION. A CRITICAL INQUIRY. By EDGAR M. CROOKSHANK, M.B., Professor of Comparative Pathology and Bacteriology in, and Fellow of King's College, London; author of Papers on the Etiology of Scarlet Fever, etc.; A Manual of Bacteriology, etc. Large 8vo., 2 vols., pp. 466, 610, with 23 colored plates. London: H. K. Lewis, 1889.

THIS is an extremely interesting and valuable work, whose title, however, is not exactly descriptive. It is really a History of the Origin and Introduction of Vaccination, with a Discussion of its Pathology. To constitute a history of vaccination in the full significance of that expression, there would be needed an account of the accumulated evidence concerning the results of vaccination throughout the world in antagonizing smallpox and promoting its extirpation. This account Dr. Crookshank has not given or attempted in these volumes.

Vol. I. begins with a full history of inoculation, from ancient times down to the general prevalence of the Suttonian method, near the end of the last century. Then we have an account of the recommendations and practice of Dr. Haygarth, of Chester, England, in 1777, being a system of isolation. According to the report of Dr. Waterhouse, of Boston, this was yet earlier brought into use in New England. Next follows the "Tradition of the Dairy Maids," with the story of Farmer Benja-

min Jesty (whose portrait is the frontispiece to Vol. I.), and his vaccination of his wife and sons in 1774; Dr. Edward Jenner's life, his investigations, trials and triumphs, filling more than 160 pages, including a number of Jenner's letters and other papers.

The remainder of Vol. I. is chiefly engaged with a record of investigations by different observers in regard to the pathology of vaccination, its relation to human smallpox, to cattle plague, sheep-pox, goat-pox, and grease of the horse. Dr. Crookshank concludes (p. 459) that "there is no more reason for supposing that human smallpox was," in many experiments which he has mentioned, "transformed into cow-pox than there is for believing that cow-pox, horse-pox, human smallpox, cattle plague, and sheep-pox are all manifestations of one and the same disease." Careful reading of the series of facts given in this volume will, we believe, impress a different conviction upon many minds, namely, that (doubtfully) excluding cattle plague, there is reason for believing that all the above-mentioned disorders *are* modifications of the same disease. This seems to follow from the observations and experiments of Gassner, Viborg, McMichael, Sonderland, Waterhouse, Ceely, and Badcock. Seaton's language on this subject is:[1] "The common origin, then, of smallpox and cow-pox may thus be considered as established." It is at the same time an important fact, the non-appreciation of which has given rise to much confusion, that the cow, horse, and other animals are subject to different eruptive affections, not all identical with variola, or capable of taking the place of vaccinia, or of equinia, the variolous horse-pox.

Dr. Crookshank's closing chapters in Vol. I. relate to the "Introduction of Vaccination in Foreign Countries," and "Progress of Vaccination in England." The first of these subjects is disposed of in eighteen pages; the second, with the author's reflections, occupies nearly forty pages. The narrative contained in the latter is very incomplete. The latest English document expressly referred to is the *Blue-book on Vaccination*, compiled by Dr. Simon in 1857, on which Dr. Crookshank curtly remarks: "It would be out of place here to analyze that report, but it remains as evidence of the extraordinary hold which the Jennerian doctrine had upon the minds of even distinguished sanitarians." After a detailed account of many occurrences of "spontaneous cow-pox" in England and other countries, we find at last a clear announcement of Dr. Crookshank's opinion on the main subject of his work. This, as he tells us, has been reached by his "investigations into the history, and especially the pathology, of vaccination." He asserts that "neither do cow-pox, horse pox, sheep-pox, cattle plague, or any other radically dissimilar disease, exercise any specific protective power against human smallpox." "For the eradication of this disease we must in future resort to methods similar to those proposed by Haygarth, which in modern times have been so successful in *stamping out* diseases of the lower animals." "There can be no doubt that ere long a system of *compulsory notification and isolation* will replace vaccination." "It is probable that when by means of notification and isolation smallpox is kept under control, vaccination will disappear from practice, and will retain only an historical interest."

For such conclusions the volumes before us afford neither good prac-

[1] Reynolds's System of Medicine, American edition, vol. i. p. 177.

tical evidence nor sound reason. The value of an otherwise fine work is greatly impaired by their statement. They are contradicted by an immense mass of facts which the author simply ignores. Take, for example, only such facts as these: At the close of the last century Dr. Lettsom and Sir Gilbert Blane estimated the smallpox death-rate in England and Wales at not less than 3000 per million of population. Since the era of vaccination, no country in the civilized world has suffered any large fraction of such a mortality from smallpox. From 1854 to 1865 the rate in England and Wales was 202 per million; 100 per million is now a probable average. In Ireland during the years 1866–'69 there was no smallpox. In Boston, Mass., from 1873 to 1881 two deaths only occurred from it. So far as vaccination fails to extirpate smallpox, the explanation is plain: it is *the imperfection with which general vaccination is carried out.* Isolation will never replace the Jennerian preventive; it may and should properly supplement it. The publication of Dr. Crookshank's unwarranted speculative opinions is much to be regretted; not because they are likely to affect many medical minds, but because so imposing a work, in some respects so meritorious, coming from a member of the profession, may present to unprofessoinal readers an appearance of authority which does not rightly belong to it.

Vol. II. contains a number of very interesting documents and essays; beginning with Jenner's "Inquiry," reprinted from his first edition, of 1798, and ending with Dr. Crookshank's own account of "An Outbreak of Cow-pox near Cricklade (Wiltshire)," in 1887. These volumes are handsomely printed, and the plates in Vol. I. add much to the value of the text. Altogether, the work is entitled to a place in every well-furnished medical library. It is a storehouse of extremely important facts from which wiser conclusions may be established than those which are reached by the author. His zeal and labor may be commended, while his lack of judgment must be lamented. H. H.

ARBEITEN AUS DER ERSTEN MEDICINISCHEN KLINIK ZU BERLIN. HERAUSGEGEBEN von DR. E. LEYDEN, o. ö. Professor, Geh.-med. Rath, Director der 1. medicinischen Klinik zu Berlin. I., Oct. 1888 bis Oct. 1889. 8vo., pp. 273. Berlin: August Hirschwald, 1890.

THIS octavo volume of 273 pages is a reprint of articles that have appeared during the past year in various medical journals. The authors are four in number: Leyden, Klemperer, Renvers, and Scheurlen, and they are to be congratulated on having presented in this book, a noteworthy contribution to clinical medicine. The article by Leyden on the prognosis of heart diseases, with which the work begins, is doubtless familiar to students of German medical literature, and the same is true of Klemperer's contributions on the motor activity of the stomach, dilatation of the stomach, and the dyspepsia of consumptives. The articles by Renvers on "Empyema," and that of Scheurlen on "Pyothorax Subphrenicus," deal in a masterly manner with subjects of great clinical interest.

One of the most interesting, although one of the shortest, papers is the

report of a case of carbonic oxide poisoning, by Leyden, in which recovery took place after transfusion. Leyden makes the interesting statement that, so far as he has been able to ascertain, this is the only case of carbonic oxide poisoning which has been treated by transfusion during the last fifteen years. The increasing number of cases of this form of toxæmia, due to the introduction of water gas, makes it important to emphasize the fact that after a thorough trial of the ordinary means of resuscitation, transfusion, preceded by venesection, should be performed. It is scarcely necessary to say that the fluid transfused should be blood, either pure or defibrinated.

Although the experiments of Hunter tend to demonstrate that transfused blood possesses no nutritive value, they also show that the "red corpuscles transfused remain for a certain time within the circulation of their host." This is the important point—the introduction of new corpuscles—for the old ones are paralyzed by the intimate union of carbonic oxide with their hæmoglobin.

Cases of carbonic oxide poisoning are not often reported, and this one is of particular interest when studied in connection with the remarkable cases of the same sort reported by Stevenson in the last volume of Guy's Hospital Reports. F. P. H.

THE TREATMENT OF INTERNAL DERANGEMENTS OF THE KNEE-JOINT BY OPERATION. By HERBERT WILLIAM ALLINGHAM, F.R.C.S., Surgeon to the Great Northern Central Hospital, etc. 8vo., pp. 165. London: J. & A. Churchill, 1889.

As "internal derangements of the knee-joint," Mr. Allingham groups all non-constitutional affections of the semilunar cartilages and alar ligament, loose and pediculated cartilages, and hypertrophied synovial fringes. The book has been written with the almost sole idea of elucidating which of these conditions are "likely to be remedied by operative treatment, and how are such operations to be performed" with the greatest degree of success, while minute pathology and theoretical considerations are practically ignored. In this, and in presenting a good synopsis of the pathology as well as excellent description and classification of the various disorders considered, he has succeeded most happily; but, further, by adding many valuable suggestions and original points—more particularly those relating to the semilunar cartilages and alar ligament—he has given to the work a decided individuality and practical worth.

Chapter I. deals with the semilunar cartilages, their anatomy, physiology, and gross pathology, the causes, classification [new], symptomatology, and diagnosis of their displacements. Chapter II. considers treatment of the same. The vertical incision which the author here brings forward as a novelty we have long been familiar with, and had considered it to be the most generally accepted method of exposing the cartilages.

Chapter III. groups abstracts of a large number of cases which have been operated upon by various surgeons, as well as the more full reports of eight cases of his own. Chapter IV., a very instructive and somewhat original one, treats of the ligamentum alaria as a cause of joint in-

terference, and describes its anatomy, pathology, and Allingham's method of treatment. Chapter V. takes up the pathology and treatment of "loose cartilages" and hypertrophied synovial fringes; while the final section is devoted to a consideration of "hydrops articuli." By way of excuse for the inclusion of chronic joint effusions in the work, the author states that he has been led to do so not because he considers them to come properly within the limits of his title and classification, but that he may have opportunity to express forcibly his very decided views—which, by the way, are amply shared by American surgeons—upon the great benefits to be derived from operative measures in many conditions of joint-weakening by chronic effusions.

We are fortunate in now having the formerly scattered and more or less obscure fragments of knowledge of these affections gathered into such concise and useful shape, to say nothing of the many original additions thereto which the author has introduced.

SUPPURATION AND SEPTIC DISEASES. THREE LECTURES DELIVERED AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, IN FEBRUARY, 1888. By W. WATSON CHEYNE, M.B., F.R.C.S., Hunterian Professor; Surgeon to King's College Hospital and to the Paddington Green Children's Hospital; Examiner in Surgery at Edinburgh University. 8vo., pp. xiv., 102. Edinburgh and London: Young J. Pentland, 1889.

To those who read these charming lectures at the time of their delivery,[1] their reappearance in the present handy volume will be most welcome. It is seldom now-a-days that a book treating of any subject related to bacteriology can reappear after an interval of nearly two years without substantial alteration, so rapid is the growth of our knowledge. Yet this has been possible in the present case, for the recent progress in our knowledge of the etiology of septic diseases has brought to light facts confirmatory only of the carefully formulated theories of the author. These new facts receive abundant recognition in many notes in finer type scattered through the text, thus keeping the book abreast of the times. These, and four illustrations of some of the cocci and lesions described, compose the changes in the present edition; the text remains unaltered.

It will be remembered that the lectures embodied a statement of the modern theory of the causation of suppuration and septic diseases. In the first, the various microörganisms which have been found in connection with suppurative processes are described, and it is shown by the rehearsal of various inoculation experiments in animals and man that these are capable of producing suppuration and abscess. We learn that the frequent occurrence of these microörganisms in the tissues of the body without suppuration makes clear the necessity for certain predisposing conditions before their pyogenic effects can be exerted. The second and third lectures are accordingly devoted to the consideration of the conditions exerting a modifying influence on the action of the bacteria of suppuration in the tissues. Among these are discussed em-

[1] Published in the British Medical Journal of February 25th, March 3d, and March 10th, 1888.

bolism, general and local depression of vitality, inflammation, exposure to cold, injury, the effects of irritating chemical substances, the seat of the inoculation; the species of organism gaining access to the tissues and the amount of it present, its existence alone or in conjunction with other bacteria. The influence of season and locality, and the occurrence of the pyogenic bacteria outside the body are also considered. In conclusion the most careful asepsis, both during operation and in the dressing, is recommended as the only known means of exclusion of the germs of suppuration which offers any certainty of success.

The book is completed by a useful bibliography of the most important literature of the subject, and by an index. J. S. E.

LEPROSY AND ITS PREVENTION, AS ILLUSTRATED BY NORWEGIAN EXPERIENCE. By ROBSON ROOSE, M.D., LL.D., F.C.S. 12mo., pp. 96. London: H. K. Lewis, 1890.

DURING several visits to Norway in recent years the author has had many opportunities of observing cases of leprosy, and of studying the forms and clinical features of the disease as it appears in that country. The especial object of the book is to point out the manner in which the spread of the disease may be arrested, and to invite attention to the lessons to be drawn from recent experience in Norway. A steady diminution in the number of cases, as shown by trustworthy statistics, has been observed. The history and present distribution of the disease, its forms and symptoms, its morbid anatomy and causation, together with its treatment and prevention, are all considered. The disease is regarded as incurable, although it is admitted that some benefit may be derived from the remedies usually employed, and that treatment and hygienic measures should in all cases be instituted.

In 1885 a law was passed in Norway that all lepers (not in asylums) should be isolated in their homes, and that failure to comply with this regulation was to be followed by their compulsory removal to these institutions. Isolation of a leper in his own house means that he must live in one room set apart for him, but he may walk about in the open air and with friends. The Norwegian physicians have convinced their fellow countrymen that leprosy is contagious, and that isolation of the patients is the only efficacious measure for eradicating the disease. The author thinks that there is every reason for expecting that leprosy will become extinct in Norway in the course of a few decades. The book is pleasantly written in a semi-popular style, and can be read with interest and profit by all.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Action of Caffeine.

We have for a long time been familiar with the accounts of various travellers as to the surprisingly stimulating properties of such substances as tea, coffee, kola nut, and guarana. It is, however, remarkable that all these substances contain caffeine, and many attempts have been made to explain the physiological action of this alkaloid. According to some, the special action of this alkaloid is directed to the muscles; according to others, it acts exclusively on the nervous system.

Professor Sée (*La Tribune Médicale*, March 13, 1890) believes that caffeine owes this property to its power of increasing the activity of the motor nervous system, both of the medulla and cerebrum. As a consequence of this double action he would find the freedom from fatigue. Further, he claims that caffeine prevents loss of breath and palpitation as a consequence of severe muscular effort, and he states that, from experiments made on thirty healthy individuals, in nearly all cases running did not modify the respiratory rhythm provided caffeine had been administered, while the same individuals running the same distance, at the same rate of speed, suffered from loss of breath, and the number of respiratory movements was tripled.

Professor Sée concludes his paper with the following *résumé:* Caffeine, in small repeated doses, when given to soldiers on the march, facilitates muscular work, not by directly increasing the activity of the muscle itself, but by acting on the cerebro-spinal system. The consequence of this double action is the diminution of the sensation of effort, and the prevention of the feeling of fatigue.

Caffeine prevents shortness of breath and palpitation as a consequence of severe effort.

Under its use, individuals subjected to prolonged violent exertion acquire the characteristics of persons in perfect physical training.

In producing this excitation of the cerebro-spinal motor system, on which depends the increase of muscular tonicity, caffeine increases the loss of carbon by the organism, but it does not restrain the loss of nitrogen, and does not thus in reality save tissue-waste.

A means of preventing tissue-waste, and so preventing the effects of inanition from fasting, is absolutely impossible of realization. With caffeine, although intense work is rendered possible, it is only obtained at the expense of the organism. The animal machine can only operate at the expense of tissue-combustion, and it is precisely in facilitating this combustion that caffeine enables muscular work even during fasting.

Caffeine has thus not the property of replacing foods, but only replaces the tonic general excitation which the general ingestion of food produces. It one could assume that it was the direct, immediate, instantaneous action of foods which stimulated the stomach and the nervous system, and that their alimentary value does not extend beyond this, they could be substituted by stimulants.

Finally, Professor Sée holds that the action of caffeine on the heart and bloodvessels is different from what is generally maintained, and is a much more active stimulant than is usually believed.—*Therapeutic Gazette*, May, 1890.

Professor E. T. Reichert has recently published the result of his experiments to determine the action of coffee on tissue-metamorphosis by the calorimetrical method.

Healthy dogs were used, and in a fasting condition, having been fed the evening before. Each observation was conducted for six consecutive hours, and always during the same period of the day. During the first hour a normal record was obtained, then the caffeine was given hypodermically and its effects studied during the subsequent hours. Three series of experiments were made distinguished by the difference in dosage.

Dr. Reichert considers that caffeine increases heat-production and as a corollary increases destructive tissue-metamorphosis. It might be supposed that the actual waste of energy is in some way diminished, as, for instance, by a lessened heat-dissipation, the quantity of heat thus concerned becoming apparent in work, but this assumption is nullified by the fact that both heat-production and heat-dissipation are increased, and accordingly that the actual waste of energy was greater. There seems to be no other explanation than that the virtues of coffee in the wear and tear of active life are entirely subjective, and depend upon a general excitation of the higher tissues, and chiefly upon its powerful exhilarant action on the mental processes. The assumed ability of coffee to replace food, or to increase the power for work without corresponding tissue-destruction, is consequently entirely deceptive, and the conditions produced by it are comparable to those observed in the insane, in hysteria, or in fright, where the individual may be capable of performing prodigious feats of strength and endurance, but, nevertheless, at the direct expense of his tissues.—*New York Medical Journal*, April 26, 1890.

The Influence of Coffee on the Growth of Microörganisms.

An interesting article has recently been published by Dr. Carl Lüderitz, concerning the influence of infusions of coffee on microörganisms. Investiga-

tions here reported seem to show in the most unmistakable manner, that infusions of roasted coffee have very distinct antiseptic properties, and the importance of this, from a practical standpoint, becomes apparent at once. If infusions of coffee have a marked deleterious action upon pathogenic organisms, and especially upon some forms which are the cause of epidemic types of disease, it may be a valuable agent for the restriction of these, and may be used for quenching thirst when there is any suspicion as to the contamination of water. Especially may this be true of those epidemics of typhoid fever and cholera which are transmitted almost entirely through the medium of the food and drink.

The influence of coffee infusions of different strengths, varying from ten to thirty per cent., upon the growth of various forms of pathogenic and non-pathogenic microörganisms, was carefully tested. The coffee used in these experiments was roasted Java, and the infusions were made by adding from ten to thirty parts of coffee, by weight, to seventy or ninety parts of boiling water. The coffee, freshly roasted and ground fine, was covered with boiling water, and the infusion thus prepared was placed in a closed flask in a water-bath for about ten minutes, and was then filtered through a sterilized filter.

Various forms of microörganisms were retarded in their growth and life by exposure to the infusions of coffee, but they varied greatly in their susceptibility to its action.

The typhoid bacillus was completely destroyed after an exposure in a five-per cent. infusion for three days, in a ten-per cent. infusion for one or two days. The bacillus of Asiatic cholera was destroyed in a one-per cent. infusion after seven hours' exposure, in a five per cent. infusion after four hours, and in a thirty per cent. infusion after two hours.

This is the most prompt action shown in any of the experiments; the viability of some spores was not destroyed until after an exposure of several days. The cholera spirillum was by far the most susceptible of the organisms used in the experiments, and next to it stood the anthrax bacillus without spores.

It seems probable that the antiseptic action is due to empyreumatic substances formed during the roasting of the coffee. It is not due to the caffeine, for nutrient gelatin containing a percentage of caffeine representing ten, twenty, or thirty per cent. of coffee infusion, exerts but very slight influence upon the growth of microörganisms.—*New York Medical Journal*, May 3, 1890.

The Physiological Properties of the Kola Nut.

At a meeting of the Académie de Médecine in April (*La Tribune Médicale*, April 10, 1890) Dr. Heckel read a paper on this subject, in which he claims that, even after the extraction of the caffeine by chloroform, his experiments have shown him that the powder of the kola nut still possesses marked properties, especially exerted on the muscular tissue and on nervous excitability. He states that the red substance noted by Sée in his work on the African kola, and which remains in the nut after extraction with chloroform, is a highly complex body, in which the active principles are still to be found, although he has not yet succeeded in isolating them.

The negroes in tropical Africa are able to make a march in one day of

more than forty miles, living simply on a single fresh kola nut, and Heckel claims that he has himself obtained equally surprising results through the use of the dry kola. He states that at his suggestion the French Alpine Club has adopted kola as a stimulant or nutrient in their mountain-climbing expeditions, and their general testimony is that it has rendered them the greatest service, especially in preventing loss of breath and in sustaining muscular strength.—*Therapeutic Gazette*, May, 1890.

Antimony in Inflammations.

In the *Practitioner* for March, 1885, Dr. Spender pointed out that antimony, in frequently repeated small doses, one-sixth of a grain of tartar emetic, every hour or two hours, has the power of completely dissipating early local inflammations. Acting on this suggestion, Surgeon-Major Lawrie, began the use of small and frequently repeated doses of antimony in the treatment of surgical inflammation at the Afzalgunj Hospital in May, 1885. Since then its use has been gradually extended, and he has come to look upon it as one of the most valuable of drugs, as useful in local inflammations as quinine is in malarious fever. It is now used at the Afzalgunj Hospital in all inflammatory diseases which are not of a specific nature.

It may be given without fear of causing nausea and diarrhœa or depression, even in disease where its use would appear to be contra-indicated—for example, in mucous enteritis, a most fatal disease to children on the plains of India. It has been employed in the treatment of typhoid fever, and is said to cut the disease short in a most remarkable way.

Tolerance of the drug is very soon established; there is no depressing effect unless it is pushed so far as to cause its own peculiar nausea and diarrhœa. It can be administered with cardiac tonics, and there are few, if any, cases which are susceptible of benefit by it in which it cannot be employed in sufficient quantity to do good without fear of inducing depression.

Orexin.

As a caution against disappointment in the use of this drug, especially in private practice and until further evidence is forthcoming, the experiences of Dr. Imredy and of Dr. Martin are of interest.

In order to test the value of orexin in promoting the appetite of persons suffering from anorexia, Dr. Imredy gave it to twelve hospital patients. In seven the appetite was somewhat improved, though it was rather doubtful if it was due to the orexin; in five no results followed its use. Nausea and vomiting were frequently induced, especially after its continued use.—*Münchener medicinische Wochenschrift*, April 29, 1890.

Trials with orexin or hydrochlorate of dihydrophenylchinazolin have also been made by Dr. Martin, under Dr. Rosenbach, in Breslau.

The drug was administered to twenty-nine patients, most of whom were not informed as to what was expected to be the result. Some of the patients were given pills without orexin; if the appetite improved under this treatment they were not included in any further trials; if, however, they did not gain in this regard, orexin was given. Others had pills without orexin given

to them and were told that they were to promote the appetite; if under this treatment there was any gain such patients were excluded from further tests, but such as were uninfluenced by suggestion were given orexin.

Out of twenty-nine cases included in the summary, five had their appetites increased to an inconsiderable amount only. In five others there was a similar improvement, though the pills did not contain orexin.—*Deutsche medicinische Wochenschrift*, May 15, 1890.

Effects of a Very Large Dose of Antifebrin.

A number of cases have been recorded showing that even moderate doses of antifebrin or acetanilide may be followed by toxic symptoms, but no case has until now been reported in which nearly an ounce of this drug had been taken. It has generally been supposed that the toxic properties of acetanilide are due to the aniline from which it is manufactured, and it was, therefore, to be expected that the symptoms occurring in the two cases would be very similar. Dr. Hartge, of Dorpat, who has recently had ample opportunities of observing a case in which a student, who had caught cold, had dosed himself with twenty-eight or twenty-nine grammes (nearly an ounce) of acetanilide, in addition to a considerable quantity of spirit, states that the symptoms only very partially corresponded with those mentioned by Dr. Dehio as due to poisoning by 154 grains of aniline, and which consisted in blue coloration of the skin and mucous membranes, profound coma lasting several days, irregularity and quickening of the respiration, acceleration of the pulse, the smell of aniline in the breath, loss of power of motion, considerable disturbance of the sensory powers, followed by jaundice, with anæmia, albuminuria, and hæmoglobinuria. It is probable that this aniline was by no means chemically pure, but contained several other substances, especially toluidine. In Dr. Hartge's case, notwithstanding the enormous dose of acetanilide which had been taken, a quantity which requires five-sixths of an ounce of aniline to make it, or more than twice as much as Dr. Dehio's patient took, there was no loss of consciousness, of motion, or of sensation, no albuminuria or hæmoglobinuria, and only the slightest trace of jaundice; the blood corpuscles, too, presented their normal appearance and character, there being no detritus or specks of pigment, though the color of the blood was changed to a dark blue, as in aniline-poisoning; also the respiration was rendered rapid and irregular, and the pulse accelerated. The patient complained greatly of inability to sleep, and the cardiac palpitation and dyspnœa produced a feeling as of impending death. No medical aid was sought for many hours after the drug had been taken. When Dr. Hartge saw the patient first he was much struck by the marked blueness of the skin, which was general over the whole surface, but especially dark in the eyelids, the chin, and the temporal regions. There was no puffiness, as in severe cases of asthma, and the general appearance was quite different from that of cyanosis.

Although there had been no vomiting, a glass of red wine was immediately brought up, and the stomach was soon afterward thoroughly emptied, a quantity of bilious matter being evacuated. The treatment consisted in giving sulphate of soda draughts, together with coffee and brandy; also hypodermic injections of camphor in ether, and cold compresses to the head. On the

third day the patient was able to leave his bed, and the blue color had entirely vanished.

In conclusion, Dr. Hartge, who had Professor Dragendorff's coöperation in working out the case, remarks that there is reason to believe that the acetanilide taken by the patient must have been a remarkably pure specimen.—*Lancet*, April 12, 1890.

Strophanthin.

At the Medical Congress held in Vienna in April last, Dr. Koralewski reported the results of trials of strophanthus made at the Vienna Hospital. From his experience it is fair to infer that in certain cases strophanthus may be conveniently used in the form of strophanthin.

Strophanthin was given in doses of from $\frac{1}{100}$ to $\frac{1}{200}$ of a grain, the daily amount being from $\frac{1}{40}$ to $\frac{1}{20}$ of a grain. It was administered in the form of:

℞.—Strophanthus . . . . . gr. $\frac{1}{20}$ to $\frac{1}{12}$.
Water . . . . . ℥ijss.

Sig.—Ten to twenty drops every two hours, or in capsules containing $\frac{1}{200}$ grain of strophanthin.

The effect upon the circulation to strengthen it was apparent in five or ten minutes. Its action to regulate the heart followed some two or three days later, more slowly than with digitalis, and continued some time after the administration of the drug was stopped.

Cardiac dyspnœa and palpitation were relieved by it, the former the more promptly. Diuresis occurred only after continued use of strophanthin, and even then the amount of urine was less than after the use of the tincture of strophanthus or digitalis. The increase in the flow of urine continued several days after the cessation of the strophanthin, and was apparently the result of the increased blood-pressure, and not connected in any way with a direct action upon the kidneys; no symptoms of renal irritation were observed.

Gastric disturbances were very seldom caused, even when the drug was administered for a considerable period; even then strophanthin in the form of capsules was well borne.

The bowels were unaffected, and no cumulative action was observed.

The tincture of strophanthus is, of the two, to be preferred, since its action is more certain, more rapid, and more energetic than that of strophanthin. There are cases in which the tincture of strophanthus, digitalis, and other cardiac remedies are not well borne, and here may be the opportunity for the use of strophanthin.—*Münchener med. Wochenschrift*, April 29, 1890.

Bromide of Ethyl in Practice.

Dr. Hugo Sternfeld, a practitioner in Munich, has used this anæsthetic in fifty-six cases, and advocates its more general employment. He considers that much of the disadvantage under which this drug has suffered to have been due to the impurities with which it was formerly contaminated, and that if a pure article is used its reputation may be improved.

He has found it best to administer it in an Esmarch's mask, and he

counsels a gradual rather than a rapid administration. It is of the first importance to have a pure substance.

For short operations this narcotic is especially appropriate, as the anæsthesia is quickly induced and is of short duration. Recovery is rapid, and usually with much less discomfort than follows the use of chloroform. For children and hysterical patients its easy administration is an advantage.

[Bromide of ethyl is doubtless a convenient anæsthetic, but it is a compound of bromine, and, from a chemical standpoint at least, we are justified in being suspicious of any anæsthetic which belongs to the halogen compounds. Primary anæsthesia from sulphuric ether might perhaps have answered in many of the fifty-six cases.—ED.]—*Münchener med. Wochenschrift*, April 15, 1890.

SALICYLATE OF SODA PER RECTUM.

DR. STEIN mentions a case of rheumatic fever of a severe and very obstinate nature in a lady with a very sensitive stomach, which refused to tolerate medication of any kind when administered by the mouth; he was able to treat the case satisfactorily by means of enemata of salicylate of soda. He gave three enemata daily, each containing from thirty to forty-five grains of the salicylate. The quantity of liquid used for each was about eight ounces. —*Lancet*, March 15, 1890.

SULFAMINOL.

The chemical name of this new antiseptic is thiooxydiphenylamin; it is a bright yellow powder without odor and taste, insoluble in water, but readily soluble in alkaline solutions.

By contact with the secretions of wounds it is thought to be decomposed into phenol and sulphur, and thus exert its action as an antiseptic.

It is said to be without toxic properties, and as a deodorizer it is to be preferred to iodoform, as it is without odor.—*Münchener med. Wochenschrift*, May 13, 1890.

TREATMENT OF CARDIAC DROPSY WITH CALOMEL.

Attention has been again directed to this way of treating dropsy associated with cardiac disease. It is perhaps less used than it deserves to be, partly through fear of mercurial poisoning, and it is necessary that the mouth and teeth should be kept perfectly clean.

Three cases are reported of myocarditis, with very general and great œdema and dyspnœa, in which the good results of this treatment were very conspicuous, and in which the digitalis was not efficacious. To one of the patients three grains of calomel were given four times a day for six days. There was no diuresis until the fourth day, when the urine increased from about twenty to eighty ounces, and on the fifth day to two hundred ounces; the amount of urine gradually decreased, during three weeks, to twenty ounces.

This method is of service in certain cases where other means are useless, and it is not necessary to set up severe mercurialization in order to accomplish desirable results.—*Therapeutische Monatshefte*, April, 1890.

Chlóralimide.

M. Choay has succeeded, in collaboration with M. Béha, in preparing a chemical compound which is destined, perhaps, to replace chloral hydrate. This body is chloralimide, which has the formula CCl_3CHNH. It crystallizes in long needles, and is colorless, odorless, and tasteless. It is insoluble in water, but soluble in alcohol, ether, chloroform, and fatty matters. Chloralimide must not be confounded with the other new hypnotic, chloralamide, which is, clinically speaking, chloral formamide. M. Choay considers that the activity of chloralimide will surpass that of chloralamide, seeing that for equal weight it gives more chloroform. It has no disagreeable taste and is permanent, while chloralamide is decomposed by a temperature of 140° F. The dose is the same as that of chloral hydrate.—*British Medical Journal*, May 17, 1890.

Codeine as a Narcotic.

As a remedy to quiet abdominal pain, codeine has been recommended by Brunton, and in a short paper by Dr. G. Kolber, its use is advocated as a substitute for morphine in tubercular disease of the lungs and larynx. It has the advantage over the usual substitutes for morphine—such as the extract of hyoscyamus, extract of cannabis indica, and so on, in being more reliable in its action, and without some of their drawbacks.

Systematic trials with codeine were made on more than seventy patients of various ages for a considerable period. The dose was from one-half to two-thirds of a grain, or from a grain and two-thirds to two and a half grains daily. It is, however, better to give large single doses than small and more frequent ones; for example, half a grain morning and evening is more effectual than a grain and a half in small divided doses throughout the day.

In some debilitated patients doses of half a grain caused vertigo and mental dulness; when the dose was reduced these symptoms disappeared. With very weak subjects it is well to begin with smaller doses than half a grain.

It also has the advantage over morphine of being less constipating, though there are cases, as tubercular disease of the intestines, where it is desirable to check the diarrhœa with opium.

When used in bronchial catarrh the patients expectorated more easily and less frequently. In simple chronic laryngitis morphine was found to be more reliable than codeine.

In spite of the many desirable qualities possessed by codeine, it is, of course, less reliable in its action than morphine, but in many cases will answer as an excellent substitute for the stronger alkaloid. It is, however, more expensive. —*Wiener klinische Wochenschrift*, No. 12, 1890.

Aristol in Psoriasis.

Aristol is an amorphous, reddish-brown substance prepared from a solution of iodine in iodide of potassium, and an alkaline solution of thymol. It is insoluble in alcohol, glycerin, and in water, but dissolves readily in ether.

Aristol is a harmless remedy and is efficacious in the treatment of psoriasis,

though the cure is not as rapidly effected as it may be with chrysarobin or with pyrogallic acid.

It is said to be more serviceable in lupus than any other remedy, but it has not proved successful in the hands of some practitioners.

Ten per cent. of aristol in lanolin, or in other suitable medium, is the proper strength. With this remedy we may be able to avoid the well-known inconveniences which accompany the use of the applications at present most employed.—*Berliner klinische Wochenschrift*, No. 11, 1880.

MEDICINE.

UNDER THE CHARGE OF

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Report of an Epidemic of Influenza.

Robertson and Elkins (*British Medical Journal*, February 1, 1890) report the details of an epidemic of influenza occurring at the Royal Asylum, Morningside, Edinburgh, which are of value, as the course of the cases could be carefully followed. 140 individuals were attacked, there being 992 persons in all in the institution. The symptoms may be divided into cerebral, neuro-muscular, alimentary, respiratory, circulatory, and urinary.

Cerebral symptoms.—Frontal headache was one of the most constant symptoms, and was one of the most complained of. Giddiness, light-headedness, or swimming in the head, was nearly always present. Mental depression was also a common feature. Most cases complained of sleeplessness.

Neuro-muscular symptoms.—Pain in the lumbar region was one of the most constant symptoms, and was nearly as distressing as the headache. Next in frequency to the back, the calves and the thighs were affected by the pain. The pains were seldom localized, and were generally darting and shooting in the limbs, and often of a purely neuralgic nature. A feeling of muscular weakness was a characteristic and, the authors consider, the most important symptom of the ailment. It was alluded to by nearly all the patients without suggestion. During convalescence this weakness persisted, and there was sometimes fainting.

Alimentary symptoms.—Appetite was always impaired, and in many cases there was loathing of food and nausea. Vomiting was frequent as an initial symptom, and in some cases continued a day or two. In a small number of cases there was diarrhœa, but oftener constipation. Flatulence was frequent, accompanied by severe colicky pain. In some cases there was pain and tenderness on pressure in the region of the liver.

Respiratory symptoms.—Cold in the head was frequent but not invariable, and the discharge was slight and watery, and lasted but a few hours. Sneez-

ing was rare. The conjunctivæ were suffused in many cases, often with slight lachrymation. In some instances these symptoms were more severe. There were often slight transitory hoarseness and sore throat. Over three-fourths of the cases suffered from dry cough, often troublesome, and sometimes persisting well on into convalescence. Pain in the chest was sometimes complained of, and examination of the chest in these cases always revealed sparse, dry râles, and in some instances moist râles at the bases. Several of these cases passed into bronchitis, pneumonia, and pleurisy, and all the fatal ones were due to chest complications.

Circulatory symptoms.—The pulse revealed nothing characteristic. Dry pericarditis was a not infrequent and a serious complication. The skin of the face and trunk often had a reddish flush when the temperature was high. The face sometimes had a dusky, congested appearance. No characteristic eruption was observed. Herpes labialis was present in a few cases. The patients complained greatly of waves of heat and cold passing over the body, accompanied by periodic, copious perspirations. This latter symptom was more marked than in ordinary febrile states, and persisted after the temperature had reached normal.

Urinary symptoms.—Observations on the urine were imperfect, but in two cases there was acute catarrhal nephritis.

The *temperature* was an important guide, and was always above 100° in typical cases. In the absence of complications it was always higher on the first evening than subsequently. In the great majority of cases the fever ranged between 100° and 102°.

The duration of typical cases was from two to five days. The symptoms almost invariably much abated after the first day. Rheumatic pains in some parts of the body sometimes persisted for a few days or a week. Anæmia to a greater or less extent was always present after the illness was past, and there was always loss of weight, and the appetite remained very poor.

Relapses were witnessed in 9.2 per cent. of the cases. As a general rule, the second attack was more serious than the first, and headache and fever always recurred. The majority of cases of relapse had a severe pulmonary attack (bronchitis or pleurisy), and in nearly half diarrhœa occurred. In all relapsed cases there had been distinct exposure to air, as by going out too soon. The period elapsing between the two attacks was very short.

The most frequent complication, and one which occurred in all fatal cases, was a species of pneumonia. It was present in 14 cases. It usually attacked both bases; was not of the pure croupous variety; was always preceded by bronchitis, and seemed to be rather a spread of the inflammatory process to the terminal tubules of the bronchi, and finally to the alveoli. The sputum, although fibrinous, was frothy and occasionally streaked with blood, but never rusty-colored. Bronchitis was a common complication. Pleurisy was seen in several cases, and pericarditis was found in 5 of the 10 fatal cases.

Although 10 patients died, no conclusions can be drawn from this fact, as all of the ten were subjects previously debilitated.

The first persons attacked were those who were much in the open air. The authors believe the disease to be a specific fever, but they are in doubt about its contagiousness, and think that if this exists it is only to a very

slight degree. In no case was there only a single system of the body affected.

The treatment was symptomatic. Light diet, antipyrine, salicylic acid, or quinine, enemata rather than laxatives for constipation, as it was found that diarrhœa was easily produced by even the mildest of the latter; expectorants when indicated, hypnotics for insomnia, and tonics during convalescence.

Symptoms of Pernicious Anæmia due to Osteomyelitis.

Knott (*British Medical Journal*, 1890, i. 232) reports the case of a seaman, aged thirty-two years, who had suffered on different occasions with pleurisy, remittent fever, and purpura. For three or four weeks he had been losing flesh and strength, and complained of vague pains above the chest, epigastrium, and loins. He looked anxious and ill and was put to bed, although examination revealed nothing wrong except tenderness in the epigastric and hepatic regions, and weak respiratory murmur on the right side. There was marked thickening of the sternal half of the right clavicle, which the patient attributed to a fall from a horse three years previously. After three days he began to lose appetite and vomit food, and to complain of some lumbar pain, and of increase of pain in the chest and back on deep inspiration. The epigastric and hepatic tenderness was greater; there was no jaundice. Four days later vomiting was almost incessant. There was no tenderness in any of the bones; the bowels were obstinately constipated; there was no fever; emaciation was rapidly going on. He continued to lose ground steadily, and became very weak and thin. There was much tenderness about the chest-walls, and for a few days some slight swelling over the sternum, which afterward disappeared. He then had several attacks of epistaxis. Three weeks later he looked like a man dying of pernicious anæmia. Everything he tried to eat caused disgust or nausea. The temperature one night was 100° F.—at other times normal or subnormal. He died of exhaustion on the forty-fourth day.

At the autopsy the body was found much emaciated and of a white, waxy color; the viscera pale, an old cicatrized ulcer in the stomach, and pink serum in the bloodvessels. The cancellous tissue of the ribs and sternum, clavicles and femora was found to have broken down and become transformed into a pink creamy matter. Many of the ribs were quite soft. The periosteum was healthy.

The author says that no suspicion of the osteomyelitis was entertained during life, and that it was discovered quite accidentally at the autopsy. He believes that this was the initial disease, and that the anæmia was the result of it, and says that if this view is correct it would strengthen the theory that the red cells of the blood are formed originally, or in some way matured in the marrow and cancellous tissue of bones.

Abscess of the Liver in Typhoid Fever.

E. Romberg (*Berlin. klin. Wochenschr.*, 1890, 192) calls attention to the rarity with which abscess of the liver occurs in typhoid fever; as shown by the fact that the different text-books of medicine and monographs on the disease rarely even refer to it. It may be due to one of three causes:

1. Typhoid ulceration of the bile-ducts, and suppuration spreading from this.

2. A purulent pylephlebitis following the intestinal affection.

3. A pyæmic infection, starting from some other part of the body.

There is only one example of the first category reported; this being a case recorded by Klebs. In this the branches of the hepatic duct soon after passing into the liver became large and, for the most part, cylindrical cavities.

A large number of the reported cases belong to the second class. The author details a case of this nature. This occurred in a man of thirty-four years, who, in the course of the second week, suffered repeated intestinal hemorrhages, indicating an extreme degree of intestinal alteration. A few days later the fever assumed an atypical course with irregular remissions, and the general condition was bad. It is probable that at this period the suppuration in the mesentery began, and was spreading and attacking the branches of the portal vein and causing their thrombosis. The first chill occurred on the twenty-fourth day of the disease, and probably indicated the formation of the first of the series of embolisms in the liver. After this there developed the characteristic symptoms of metastatic liver abscess, with irregular fever, chills, intense icterus, progressive enlargement of the liver with tenderness on pressure. The course of the suppurative process in this case was very rapid, only eight days elapsing from the time of the first chill until death occurred. The autopsy revealed numerous ulcers in the part of the ileum joining the cæcum, with suppuration in the mesentery of this portion, and thrombosis of the ileo-colic veins leading from it. The liver was much enlarged, and contained wide-spread thrombosis of the branches of the portal vein and numerous small abscesses. Staphylococci were found in both the thrombi and the abscesses. Two similar cases are found in medical literature, as well as two other cases in which the result of the autopsy alone is given. The author gives a brief account of these.

The third category differs considerably in the various seats of the original source of suppuration from which the pyæmic infection of the liver arose. The author gives brief abstracts of all these cases. In one of them (Louis') the source appeared to be an abscess in the parotid gland. In another (Chvostek's) a *perichondritis laryngea* was the source of infection. Freundlich saw an instance in which the cause was an abscess of the fourth finger and of the elbow, and a similar case is reported by Dunin in which it was a thenar abscess.

In the remaining instances of liver abscess in typhoid fever it is not clear to which of the classes the cases should be assigned.

The author has been able to collect from medical literature 19 cases of the affection, including his own. The number is too small to permit of conclusions as to the conditions which favor the occurrence of this complication.

The Occurrence of Typhoid Bacilli in the Urine.

Neumann (*Munch. med. Wochenschr.*, 1890, 68) has endeavored to devise a method of clinically diagnosing typhoid fever in cases in which the disease is difficult of recognition. For this purpose he has examined the urine bacteriologically in forty-eight cases. Thorough disinfection of the external geni-

tals was made, and the urine then drawn with a catheter previously sterilized by heat. Eight times he found typhoid bacilli abundant, and three times scattered in the urine. Since normal urine is free from microbes, he considers that the presence of motile bacilli in the urine of a suspected case is an observation of great diagnostic value. A positive diagnosis can, of course, only be made by the completed bacteriological tests.

At the time at which the lenticular spots appear in the skin, foci of typhoid bacilli are deposited in the kidneys. Should any of these include in the infected area a uriniferous tubule, the possibility of the passage of the microorganisms into the urine is provided. In the bladder the bacilli find very favorable conditions for their growth, and they multiply there very rapidly. It is an important fact that the bacilli are still present in the urine during the time of convalescence, and Neumann has found them up to even the twenty-third day.

The Etiology of Asiatic Cholera.

Hueppe (*Berlin. klin. Wochenschrift*, 1890, 189) concludes, from his studies and from those of Wood, of Edinburgh, upon the nature of cholera, that it is a process limited to the intestine; it is biologically a specific intestinal putrefaction with the production of a specific toxin. The loss of water and the denudation of the intestinal mucous membrane of its epithelium, though important symptomatically, are without etiological relation to the disease. As far as experiments yet indicate, the cholera bacteria, whether entering the system in a moist or dry condition, and whether inhaled or swallowed, always reach the intestine by way of the stomach. It has been found that with a proper selection of nourishment, but without the presence of oxygen, the cholera bacteria produce their poison more energetically and more quickly than under the ordinary conditions of culture in the presence of air. This is in accord with the fact that the cholera process is carried on in man under the conditions of anaërobiosis. Wood has shown conclusively that bacteria in a state of anaërobiosis are much more sensitive to external conditions than when in a condition of aërobiosis. The cholera bacteria, therefore, though very energetically producing toxin in the intestine, are much more sensitive to external agents, so that traces of acid are sufficient for their destruction. They are more easily destroyed in the fresh stool than at any other time. From a clinical standpoint, therefore, it is important to disinfect the stools and the linen at once, since with delay the resistance of the microörganisms increases. A therapeutic indication depending on the facts brought forward is to administer by the mouth some substance which may pass the stomach unchanged, and in the intestine act upon the bacteria. For this purpose salol appears to be best fitted, in the effort to exert an internal and perhaps specific action against the disease.

These observations account for the hitherto puzzling fact that cholera only seldom is contagious, transmitted directly from the sick to the well. The bacteria are in such a susceptible condition on leaving the bowel, that even if they at once find their way into the stomach of a healthy person, they will almost certainly be destroyed by the gastric juice. In a short time, however, the anaërobic cholera bacteria outside of the body, in the presence of air and supplied with proper nourishment, become aërobic.

It is also true that the cholera bacteria in the anaërobic condition are much more particular in the choice of their nourishment than when aërobic; and this constitutes another ground for their increased power of resistance outside of the body. The author also maintains that there is a third form—the arthrospores—which is even more resistant than the vegetative aërobic form. In any case, should any of the forms whose power of resistance has been increased enter the stomach, it would seem that they are not destroyed there, even by the presence of acid, but pass into the intestine, and there complete the *circulus vitiosus*.

Pettenkofer has, with reason, made prominent the epidemiological observation that, as a rule, the cholera infection is indirect, being influenced by external conditions; the principal of these conditions being the variations in the ground-water. With the diminution of the ground-water—*i. e.*, with the diminution in the degree of dampness in the upper layers of the ground, the danger of cholera increases; while with the increase of dampness in the upper layers the danger decreases. The proper explanation of this would appear to be that the cholera germ enters the ground in its most sensitive and least resistant condition. If too much moisture—*i. e.*, too little air and atmospheric oxygen—is present they simply perish. If the ground is only damp, so that air can reach them, as aërobic they increase at the expense of the nutrient matter present. If now, with these viable cholera germs in the ground, the ground-water diminishes, the conditions are those most favorable to aërobic life, and the cholera germs increase. The preliminary conditions are thus fulfilled for a miasmatic spread of a cholera epidemic. If, on the other hand, while an epidemic is in progress the ground-water increases in amount, the bacteria can no longer increase, and are either destroyed or rendered inactive, and the epidemic ceases for want of suitable infectious material. Of course, these bacteriological facts are not the only epidemiological factors; but the conclusion seems justifiable that Asiatic cholera is truly a miasmatic-contagious disease, with epidemiologically marked prominence of the dependence upon external circumstances, the nature of which bacteriologically has now become clearer.

Severe Chorea ending Fatally from Acute Paralytic Distention of the Stomach.

H. M. Brown (*Lancet*, 1890, i. 848) reports the case of a girl of sixteen years who had had acute rheumatism, and some weeks later developed chorea, attributed to anxiety about domestic matters. She was found to be suffering from severe chorea, affecting the whole body. She was emotional, crying without apparent cause, but had no delusions. There was a loud systolic murmur at the apex. The temperature was elevated and continued so, and the patient had the general appearance of a case of typhoid fever. The pulse became weak and rapid; insomnia was persistent in spite of treatment; there were great excitement and delirium. After about the eighth day the patient's condition improved somewhat, and later the delirium and chorea disappeared. Vomiting and diarrhœa, however, set in, and the abdomen became distended. On the thirteenth day of observation she went

into a collapsed condition, with greatly distended abdomen, and died. There had been no vomiting, and no urine had been passed for twenty-four hours.

Autopsy showed an enormously dilated stomach, forming a huge cystic tumor occupying the entire abdominal cavity, and extending from the diaphragm on the left side to the right iliac fossa. The contents consisted of a greenish-brown fluid containing a large quantity of acid hæmatin. The wall of the stomach was greatly thinned.

The author remarks on the great rarity of acute paralytic distention of the stomach. It is a condition causing death in a few hours with symptoms of profound shock. Two cases of this kind are described by Fagge, and presented almost identical symptoms with the case now recorded—*i. e.*, profound collapse, with great abdominal distention and suppression of urine, preceded by severe vomiting.

Whooping-cough Treated with Terpine Hydrate.

Manasse (*Therap. Monatshefte*, 1890, 116) gives some account of the constitution of terpine hydrate and of the uses for which it has been recommended, and then reports his own experience with it in the treatment of whooping-cough, having tried it in 41 cases with excellent results. In children less than one year old it may be given in dose of 22 grains per day without any deleterious effects. A careful history of each case was kept, the number of paroxysms being noted daily. In the great majority of cases 22 to 45 grains daily were sufficient in the course of four to five days greatly to reduce the number, or, at any rate, the severity of the attacks; and to hasten the recovery from the attending bronchitis.

In endeavoring to explain the method of its action, he discards at once the former view, that pertussis is in any sense a neurosis of the pneumogastric or phrenic, accepting the theory that the disease is of mycotic origin. As terpine hydrate has been shown by Colpi to possess quite powerful antiseptic properties, we might assume that the value of the drug depended upon its action upon the germs of pertussis. The author is, however, of the opinion that little is ever to be gained by the attempt to cure any infectious disease by attacking the germs themselves, since these bodies are much less apt to be injured by drugs than are the tissues of the human organism. In pertussis we have an inflammatory and catarrhal condition of the respiratory mucous membrane, which, in the severe cases, may increase to a grave condition, blocking the capillary bronchi with mucus and cellular masses, and producing alveolar collapse, lobular hyperæmia, degeneration of the terminal bronchioles, and death. Terpine hydrate does good by causing a contraction in the bloodvessels, and thus producing an anæmia of the respiratory mucous membrane with diminution of its swelling and increase of the secretion.

Albuminuria and Life Assurance.

Until recently, says Fraser (*Lancet*, 1890, i. 846), it has been assumed that the presence of albumin in the urine was in itself sufficient reason for the rejection of the candidate for insurance. A number of observations, however, have been recorded in the last few years which show that albuminuria may occur in persons who do not exhibit any of the general symptoms of

Bright's disease; while, conversely, Bright's disease may exist without constant albuminuria. The presence of albumin in the urine without any recognizable indication of disordered health is the condition in which the greatest difficulty for the examiner presents itself, especially since the shortness of the time in which these cases have been studied renders it as yet impossible to know what proportion, if any of them, afterward develop unmistakable symptoms of structural disease of the kidneys. Many of the persons in whom it occurs are of youthful age; many suffer from indigestion; the quantity is usually small, is not constantly present, and often appears only after fatigue of body or mind.

The author claims that many of the newer and more delicate tests for albumin are liable to give erroneous results. He, therefore, considers that it would be of advantage if one system of testing were always used for life insurance examination, and he would recommend the invariable adoption by medical officers of the well-known test of boiling a small quantity of urine in a test-tube, then adding a drop or two of concentrated nitric acid, and again boiling. On the understanding that the above condition is fulfilled, for the purpose of arriving at a decision with regard to the eligibility of a candidate for assurance, three groups of cases may be adopted:

A. *Those in which the urine contains a large, or fairly large, quantity of albumin.*—If the precipitated albumin exceed one-eighth of the urine after standing twenty-four hours, the proposal should be rejected, unless there exist some temporary disease of the bladder or urethra, in which case the decision may be deferred.

B. *Those in which the urine contains a smaller amount than one-eighth of albumin.*—The proposal should be rejected if there be: (1) Enlargement of the heart; (2) increase of arterial tension; (3) increase in the quantity of urine, to the extent of more than fifty ounces in the twenty-four hours; (4) a specific gravity of the twenty-four hours' urine of less than 1010; (5) a sediment containing epithelial, granular, or fatty casts; (6) with increased quantity of urine and lower specific gravity, a sediment containing hyaline tube-casts; (7) dropsy or a history of dropsy within the last two years; (8) a history of lead-poisoning, or the existence of conditions rendering this form of poisoning probable; (9) a history of scarlet fever after twelve years of age; (10) evidence of gout or syphilis, or a history of these diseases.

C. *Those cases in which the urine contains a small quantity of albumin, unassociated with any evidence of important disorder in health.*—In these cases, the conditions stated under B having been excluded, it seems prudent to adopt the following course: A sample of the twenty-four hours' urine should be re-examined on two or three consecutive days. If no albumin be found on any of these subsequent examinations, the proposal might be accepted at ordinary rates. If, on the other hand, albumin is discovered on any of these subsequent examinations, the proposal should be deferred for six months, when an examination on the above plan should again be made.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

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The Treatment of Wounds, and the Choice of Material for Drains and Ligatures.

At the seventh reunion of the Italian Surgical Society the subject of wound treatment and the choice of material for drains and ligatures was discussed by a number of the members.

Bassini stated that the employment of sponges was unadvisable, not only on account of the expense, but particularly because of the difficulty of accomplishing thorough sterilization. Wads or compresses of moist cotton should also be rejected, since small threads or filaments are frequently left in the wound, and the same difficulty in accomplishing sterilization obtains as is the case in regard to sponges. He recommends balls of salicylated cotton packed in sterilized gauze, and purified by means of dry heat. In relation to the substances employed for ligature and suture, although catgut is to be preferred from the fact that it is homogeneous with the tissues of the living organism, unfortunately it cannot be sufficiently disinfected, since it will not withstand the action of heat. Silk, however, is very readily sterilized, and in general should be preferred to catgut.

Drainage is indicated only in those cases where it is impossible to close pouches and diverticulæ by the approximation of their surfaces, accomplished by the buried suture, or where infection is imminent.

As to the choice of disinfecting substances it is impossible to speak authoritatively, since no medium has yet been found which is satisfactorily efficacious against each particular form of infection.

Gauze sterilized by dry heat and salicylated cotton to be applied immediately to the wound, with thick layers of non-medicated cotton placed over this, represent the best means of protecting wounds from post-operative infection.

Novarro, while conceding that sponges should not be employed, objected to the use of silk in buried sutures, and in case of resection of the viscera. Here catgut is preferable. If previously sterilized in a solution of sublimate, 1 : 100, it will not give rise to infection. When there is imperfect hæmostasis, or the formation of cavities cannot be avoided, tamponade with iodoform gauze, followed by secondary suture of the wound, will give the best results.

Ceccherelli stated that the double cyanide of zinc and mercury used as a disinfectant has given good results. This substance is perfectly aseptic, and exercises neither a toxic nor an irritant action upon the tissues. Its antiseptic value has not yet been determined.

CORRADI also objects to the use of sponges. He substitutes them by gauze sterilized by dry heat. Where drainage is necessary, he prefers glass tubes, since these are readily purified. He has always attached more importance to the size of the suture or ligature than to its composition, since the smaller the thread the more readily is it rendered aseptic. For this reason he prefers silk, which he soaks for upward of a year in an alcoholic sublimate solution, 1 : 1000. This solution is renewed every two or three months. Alcohol is employed in place of water because the latter diminishes the strength and consistency of the thread. When it is necessary to use coarse silk this should be subjected to the action of moist heat for thorough sterilization of the central portions, afterward it may be preserved in the alcoholic and sublimate solution. Though dressings need not necessarily be antiseptic, they must be absolutely sterile; this Corradi accomplishes by subjecting them to a temperature of 338° F. for two hours. A quantity of gauze sufficient for the dressing is placed in a metallic box, this is hermetically sealed, is left in the oven for the required time, and is not removed from its box until the surgeon is prepared to apply it directly to the wound.

LAVAGE OF THE PERITONEAL CAVITY.

DELBET (*Annales de Gynécologie*, September, 1889) concludes, as the result of elaborate experimentation upon lavage of the peritoneum, that the liquid used for irrigation should penetrate to all parts of the peritoneal cavity. If it is desired to wash out Douglas's cul-de-sac the trunk of the patient can be elevated, and the intestinal coils which have not been involved in operation or smeared with blood or discharges can be protected by sponges. It is difficult, if not impossible, to free the peritoneum completely from the foreign substances which have entered its cavity by means of lavage. In case of escape of septic liquids into the peritoneal cavity, the operator should at first employ an aseptic irrigation, and this should be followed by one with antiseptic properties. After these irrigations there always remains a considerable quantity of liquid in the iliac and lumbar fossa.

The temperature of the liquid used may vary between 64.5° and 122° F. without producing any marked effect upon either respiration or circulation. The temperature should always be that of the cavity itself, though very hot irrigations have been employed for their hæmostatic action. That such effect is produced by them is extremely doubtful. During the first minutes of intra-abdominal irrigation there is a very considerable quantity of the liquid absorbed; when a normal saline solution is used this practically amounts to a veritable transfusion. The peritoneal cavity may be washed by toxic substances without danger of general poisoning, provided the toxic irrigation is preceded for ten minutes by one of a solution of chloride of sodium of the strength of seven per cent. and is followed by a third lavage with the same solution.

SURGICAL TREATMENT OF LOCAL AND OF GENERAL PERITONITIS ORIGINATING FROM THE APPENDIX VERMIFORMIS.

The subject of peritonitis, as caused by inflammation, and particularly by perforation of the vermiform appendix, is exhaustively considered by DR. A.

KRECKE (*Deutsch. Zeitschrift für Chirurgie*, Bd. 30, April 10, 1890). He states that the variety of appendix disease which leads to peritonitis is the perforative. This perforation arises from ulceration beginning in the mucous membrane, which traverses the whole thickness of the intestinal coats and finally causes sloughing of the serosa. This ulcerative process is nearly always caused by the formation of concretions in the lumen of the appendix; rarely foreign bodies act in the same way. Where no cause for ulceration is found it is readily conceivable that a concretion might have been present, this having been washed away with the exudate.

It is well recognized that these perforations give rise to markedly different symptoms in accordance with whether they develop suddenly or are of more gradual formation. If the process is slow the peritoneal surfaces surrounding the inflamed area have time to form adhesions, so that when the opening into the bowel is finally accomplished, simply a circumscribed inflammation of the peritoneum results. When, however, there is a sudden perforation the contents of the appendix are freely distributed in the general peritoneal cavity, and as a result general peritonitis sets up.

It is to be noted that perforative peritonitis dependent upon disease of the appendix occurs, almost without exception, in individuals who were, up to the time of their attack, in good health and in full possession of their bodily strength. It is self-evident that such an individual is far more able to endure, not only the exhaustive effect of the disease, but also the shock of an operation, than is one who has passed through a long period of exhausting disease. The outlook for success after operation is in the former most favorable.

A further noteworthy peculiarity in appendix peritonitis is dependent upon the anatomical relations of this portion of the intestines. For instance, if there is a perforation in any part of the small intestine, the free motion of this portion of the alimentary tract causes wide distribution of the intestinal contents, so that the infection of the peritoneum becomes at once general. The appendix, however, is far less movable than the small intestine or even the stomach itself; therefore, its contents, even if discharged, will be found only in the portion of peritoneum immediately circumjacent. It can also be readily seen that a much smaller quantity of septic matter can escape from an opening in the appendix than where the bowel itself is wounded.

Clinical facts strongly confirm the truth of these propositions, since in no portion of the abdominal cavity is local peritonitis more common than in the right iliac region.

In considering the inflammation of the peritoneum under discussion, a knowledge of the two forms described by Mikulicz is of great importance. Mikulicz states that upon perforation of the bowel, either the whole peritoneal cavity is at once infected, or the peritoneum lying immediately about the perforation is alone involved. The first form of general inflammation he calls diffuse septic peritonitis. This is characterized by a virulent course. The second form he names progressive fibrino-purulent peritonitis; in this the suppurative process slowly extends, the new masses of pus becoming successively encapsulated. From an operative standpoint, a distinction between these two different forms of peritonitis is of cardinal importance, since in the first an extensive opening of the belly, with elaborate disinfection and drainage, is indicated; while in the second every precaution must be taken not to disturb

the adhesions which protect the general peritoneal cavity from the local process.

Another most important point in the consideration of appendix peritonitis, is the fact that the diagnosis is usually made with great ease. Together with the general symptoms of peritonitis there is usually a history of pain beginning in the right iliac fossa. If the patient is a child, this is an additional reason for suspecting appendicitis, since the age of childhood is most prone to this form of perforative peritonitis.

From the foregoing points it will be seen that this form of peritonitis gives promise of far better results than can be hoped for from inflammation dependent upon perforations of other portions of the alimentary canal.

On first sight, it would seem that a careful review of the published cases might give us statistical results which would definitely determine the value of operation in these cases. Such a study can, however be of little service, unless cases are reported with far more care than has hitherto been observed; for in making comparisons, not only must the form of peritonitis be clearly indicated, but the stage in which operative procedure was undertaken, since in the beginning of an attack the prognosis is far better than where the knife is used only as a last resort. Krecke records two operative cases ending successfully, one of general, the other of local peritonitis, and each dependent upon perforation of the appendix. He notes that the diagnosis was in each case easy, depending in the main upon the seat of pain and tenderness at the beginning of the attack, and being further corroborated by the fact that both patients were children.

Especial attention was paid, before operation, to determining whether or not there was free gas in the peritoneal cavity. The liver dulness was in one case completely abolished; nevertheless, on laparotomy, the presence of gas was not confirmed. This is a further proof of the fact that liver dulness can be made to disappear by meteorism. According to Leube, escape of gas can only be diagnosed when, on placing the patient upon his left side, tympanitic resonance is found occupying the normal area of liver dulness in the axillary line.

The distinction between a diffuse septic peritonitis in one case, and a progressive fibro-purulent form in the other, was comparatively easy, since one exhibited in twenty hours the most violent symptoms of a general purulent peritonitis, while the other, after two days, showed symptoms of very moderate severity. In both cases the therapeutic indications were plain; excision of the diseased vermiform appendix offered the only hope of cure. In the case characterized by a diffuse peritonitis this was accomplished, but in place of suturing the opening into the bowel left after excision, the latter was simply ligated, as it was believed that recovery was impossible, and every means was used to hasten the completion of the operation lest death should take place on the table. When, however, the child improved, the parts were inspected with the object of replacing this ligature by a careful suture; adhesions seemed to have successfully accomplished the closing of the bowel end; these subsequently broke down, and a secondary operation was required for the closing of the opening in the vermiform appendix. In the second case great care was taken not to break up any of the limiting adhesions.

In regard to the after-treatment of perforative peritonitis dependent upon

appendicitis, there is a general agreement that drainage should always be employed. This seems best accomplished by means of iodoform gauze, due precautions against poisoning by a too free use of this antiseptic being taken. In most cases the iodoform tamponade can be removed in a few days, when the wound can be closed.

The treatment of perforation of the appendix followed by peritonitis is operative, and no other measures should be for an instant considered; where the knife is used promptly even the most hopeless cases may recover.

It has been claimed that the purely local form of peritonitis resulting from ulcerations which are slow in their extension is amenable to medical treatment, and that the results of such treatment are far better than can be promised by the use of the knife. It will practically be admitted that appendicitis is identical with a circumscribed peritonitis. The question of operating upon these cases will depend more or less upon the presence or absence of pus. The question as to whether in every case of perityphlitis a collection of pus can be diagnosed, is one of prime importance. The testimony of various authors differs in regard to this point. Krafft found that every one of 106 cases of perityphlitis were accompanied by pus. Holländer believes that of 80 cases which were treated and cured pus was present in all. Leyden, however, claims that an exudate only is present in the early stages of perityphlitis, and that the treatment should be designed for the purpose of preventing the occurrence of suppuration. Krecke believes that in all these cases there is abscess formation, though he admits that possibly there may be exceptions. If perforation occurs, suppuration invariably follows. There are cases in which the ulcerating process does not extend to the serosa, and simply causes a more or less extensive adhesion of peritoneal surfaces. Even in these cases excision of the vermiform appendix is imperatively demanded, since thus the danger of later perforation is avoided. Holländer states that of his 80 cases treated medically not a single one terminated fatally. Though surgery can as yet show no such results, it must be admitted that these statistics are exceptional. Moreover, the subsequent histories of these cases would have a most important bearing, since recidivity is very frequent. Cases have been described in which it seems evident that absorption of abscesses has taken place, yet certainly this is quite exceptional.

Leyden and Israel have given a valuable rule for determining when pus formation is taking place. According to them, if after amelioration of the typical symptoms of perityphlitis the temperature again rises, the pulse becomes more frequent, symptoms of peritoneal irritation appear, and the general condition of the patient becomes worse, the diagnosis of pus formation can be made with great certainty. Under these circumstances exploratory puncture has been advised; this, however, is not to be recommended, since it is attended with danger to adjacent parts, and since, even though it fail to show signs of pus, there can be no surety that the latter is not present. Exploratory incision is greatly to be preferred. After reaching the peritoneum the condition of the parts below can be palpated through this membrane, and, if a collection of pus is found, an incision can be made directly into it. If, however, no abscess is found, Sonnenburg's method of tamponing the wound and making another examination after one or two days, can

be followed. By this means it has happened that an abscess which could not be found has later been spontaneously evacuated through the exploratory abdominal wound.

In regard to the position of the parietal incision no binding rule can be established, since the appendix is movable. Generally a curved incision, such as that made for the ligation of the iliac artery, will be found most satisfactory. This will enable the surgeon to make a retro-peritoneal examination, as well as to reach the seat of trouble directly. If the peritoneum is wounded in the course of the operation, this wound should be closed at once by suture, and need cause no anxiety. In general it will be found better not to open the peritoneum immediately, and to protect carefully the loops of small intestine when the incision is finally made.

Since Toft has found that one out of every three men suffers from disease of the appendix, Krecke holds that excision of this process at birth, as a routine practice, is not so absurd as it would at first seem.

Nephrorrhaphy.

The treatment of movable kidney by suture is very carefully considered by Dr. W. W. Keen (*Boston Med. and Surg. Journ.*, June 5, 1890). The author distinguishes between movable and floating kidney. The former lies posterior to the peritoneum, while the latter has a mesonephron and lies within the peritoneal cavity. A clinical distinction between the two is impossible, since one may be quite as movable as the other.

The fact that movable kidney is generally overlooked is evidenced by the statement that of 1032 autopsies upon women 32 instances of this condition were found, while in 392 autopsies upon men it occurred 3 times. Oser calculates that 10 per cent. of mothers have this affection. It is more frequent in women than in men in the proportion of seven to one, and is more than ten times as frequent in the right side as in the left. Floating kidney is, of course, always congenital. The cause of movable kidney is commonly a fall, blow, or other traumatism. At times it originates from either frequent pregnancy or loss of fat. The diagnosis is generally clear: a movable tumor in the flank of the size and shape of the kidney, which can be pushed back into the loin, and displaced to or beyond the middle line, is indicative of the condition. Percussion of the loin assists, but it is less reliable than resistance to bimanual examination. Sometimes the hilum and the pulsating renal artery can be felt. The urine is generally normal, though it may contain albumin.

The discomforts incident to movable kidney are many and decided: Bearing-down or dragging pains in the loins, gastric disturbance, fetid breath, vomiting, and at times marked cardiac symptoms, all have been frequently noted. Besides discomfort there is serious danger to life if the affection is not remedied. Both hydro-nephrosis and abscess have resulted from movable kidney.

In treating these cases a pad and bandage should always be tried first. If this is unsuccessful nephrorrhaphy should be the next resort of the surgeon, since nephrectomy is attended by a high mortality. Four methods of fixation have been recommended:

1. By passing sutures through the fatty envelope of the kidney. This method is regarded as insufficient.

2. By stitching through the fibrinous capsule.

3. By passing the stitches through the parenchyma of the kidney. Only occasionally has any blood been found in the urine.

4. By splitting and stripping back the capsule to obtain cicatricial union between the raw kidney substance and the surrounding tissues. The stitches are passed through the parenchyma where it is still covered by the fibrous capsule. Only four cases have been operated upon by this method—a number as yet insufficient to form a judgment as to its merits.

The third method has given the author very good results. The kidney seems to tolerate the presence of sutures for a long time without trouble. Both extremities of the kidney should be secured by three stitches with four additional threads, two passing through the anterior and two through the posterior lips of the wound, respectively, and penetrating the kidney substance. Fine silk is used as suture material, and the stitches should be left in place. The external wound should not be sutured, as it closes quickly.

In the after-treatment the patient must be kept in bed for not less than one month, and when she is allowed to rise should wear a snug-fitting elastic bandage.

The paper is accompanied by a table of all the recorded cases—128 in number. Four deaths occurred, one not due to operation but to ileus; a second was fatal from inflammation of the pleura due to stitching the kidney to the twelfth rib; in the third death was caused by passing the stitches through an old infarct, resulting in septicæmia; and the fourth from later suppuration, probably the result of operation.

The author has performed four cases all apparently successful, though sufficient time has not yet elapsed to determine what the ultimate results may be in regard to permanent relief.

The Treatment of Vesical Calculus in Male Children.

In considering the treatment of vesical calculus in male children Dr. J. William White (*Medical News*, May 17, 1890) shows that the most powerful argument against the modern operation of litholapaxy, that is, the liability to recurrence, obtains mainly in the aged or in those suffering from marked pathological conditions of the bladder or prostate. In children the bladder is usually healthy and the prostate undeveloped. The urethra is proportionately as capacious as is the case in the adult, and will generally admit, after meatotomy, a No. 16 (French) lithotrite. Among other objections to lithotomy may be urged the fact that there are reported cases of emasculation following the perineal cut, and that statistics show a greater mortality than obtains in the crushing operation. The author believes the following conclusions in regard to the choice of operation in male children justifiable:

1. In every case of calculus in male children[1] litholapaxy, on account of ease of performance, low mortality, speedy recovery, and absence of danger of emasculation, should be the operation of predilection, division of the

[1] These remarks apply almost as well to adults.

meatus being freely resorted to if that portion of the urethra offers an obstacle to the introduction of instruments.

2. The lithotrite and evacuating-tube should be of a size which can be inserted into the bladder without much effort or over-distention, and great gentleness should be observed in passing these instruments.

3. They should be withdrawn and reintroduced as seldom as possible, the stone being finely pulverized before the lithotrite is taken out at all. In seeking for or attempting to seize the stone, care should be taken to avoid such wide separation of the blades as will bring the male-blade in frequent contact with the vesical neck. The crushing should invariably be done only after rotating the blades into the centre of the bladder. Every particle of the calculous dust should be evacuated.

4. Rest in bed, milk diet, and sterilization of the urine by boric acid or salol given internally both before and after the operation are valuable adjuvants. During the operation every antiseptic precaution should be observed.

5. The exceptional cases of calculi which are both large and hard may be best treated by suprapubic lithotomy, but neither unusual size nor a moderate degree of density should of itself alone be thought positively to contraindicate litholapaxy.

6. Perineal lithotomy has now a very limited field, and should be employed chiefly in those cases of stones thought to be of small or medium size in which no lithotrite, however small, can be introduced with safety.

A Method of Applying Antisepsis in the Treatment of Recent Anterior Urethritis.

Dr. J. William White (*Medical News*, June 14, 1890) in a clinical paper upon the treatment of recent gonorrhœa by antiseptic agents, gives the result of his experience in this class of cases. He states that the evidence as to the causative *rôle* of the gonococcus in the development of gonorrhœa is daily becoming more conclusive, but that this theory is not necessary as a rationale for the antiseptic treatment of gonorrhœa, since the successful treatment of suppuration anywhere demands the employment of antiseptic agents. He points out the difficulty in the sterilization of the mucous surfaces of the urethra, and classes the topical remedies commonly employed as follows:

(1) Those which, when strong enough to exert a sufficient germicidal action, are locally so irritating as to be harmful or unbearable. This class includes nitrate of silver, carbolic acid, chloride of zinc, iodine, chloral, potassium permanganate, salicylic acid, and creasote, all of which have been faithfully tried in many cases and by competent surgeons. The concurrent testimony is, that when used in sufficient strength to sterilize the discharges, they produce an amount of local irritation and swelling, ardor urinæ, chordee, and even, exceptionally, urethral ulceration, that far outweighs any advantage to be derived from their antiseptic properties.

(2) Those which are such feeble antiseptic agents that they cannot be depended upon to destroy all the bacteria found in urethral discharges. Among these may be mentioned resorcin, thallin, quinine, the sulphate and acetate of zinc, lanolin, sulphur waters, tannin, alum, hydronaphthol, and cadmium sulphate. The clinical and experimental evidence coincide as to

most of these drugs; each has its more or less enthusiastic advocates, but when given a wider trial has been found disappointing, while bacteriologists have shown that the germicidal action was either limited to a very few varieties of bacteria, or was slow and uncertain.

(3) The third class includes a number of agents which are open to the same objection of too feeble or too limited antiseptic action, and have the additional drawback of insolubility in ordinary media and of occasionally becoming mechanically irritating from the formation of concretions. Among these are iodoform, calomel, bismuth subnitrate, oxide of zinc, and other insoluble powders.

Dr. White states that in the above list are omitted the five drugs which, in various combinations, are of the most practical value in attempting by topical treatment to secure asepsis in the inflamed urethra. These are: Corrosive sublimate, sulpho-carbolate of zinc, boric acid, peroxide of hydrogen, and the salicylate of bismuth.

The method of deep irrigation or retro-injection he finds unsatisfactory, but orders instead frequent injections from a large syringe with moderate force, using the strongest solutions that can be given without causing pain, and preventing the fluid from passing too deeply by instructing the patient to sit upon a folded towel during injection so as to occlude the membranous urethra. His results were not materially improved until a solution of sulpho-carbolate of zinc (ten grains to the ounce of the mixture) in a ten to fifteen per cent. lotion of peroxide of hydrogen was added. This provided a formula which, both clinically and experimentally, showed excellent antiseptic properties. The best results were attained when, in addition to this treatment, or often entirely omitting local treatment, six to eight capsules a day were given by the mouth, each containing—

Salol	3½ grains.
Oleoresin of cubebs	5 "
Para balsam of copaiba	10 "
Pepsin	1 grain

Of fifty-three cases of recent urethritis thus treated, and of all grades of severity, a distinct and unmistakable effect was produced upon the discharge in every instance but two, in which a violent indigestion prevented a thorough trial of the capsules. In about two-thirds of the whole number the discharge almost or entirely disappeared during the first week after treatment was begun. In but one case of the whole number did gonorrhœal rheumatism develop. This was especially noteworthy in three cases which had never before been free from joint trouble during an attack of gonorrhœa.

The author's conclusions upon this subject are as follows:

1. The microscopical and experimental evidence in favor of the bacterial origin of gonorrhœa is confirmed by clinical and therapeutical experience.

2. The results of antiseptic treatment have not been so uniformly successful as would be expected, on account of—*a*, the anatomical and physiological peculiarities of the male urethra; *b*, the difficulty of applying sufficiently energetic local antisepsis; *c*, the necessarily intermittent character of such applications, and *d*, the failure to combine with the topical treatment appropriate internal medication.

3. No one antiseptic agent can be depended upon, in the strength at which it can be borne by the inflamed urethral mucous membrane, completely to sterilize the discharges and the suppurating surfaces. A judicious combination of several antiseptics, if not essential to success, is at least of considerable value.

4. The internal administration of salol in conjunction with copaiba and cubebs renders the urine aseptic and probably antiseptic, so that it acts as an exceptionally thorough and efficient antiseptic injection, shortening the duration of the disease and diminishing the frequency and severity of the complications.

5. The production of urinary asepsis by internal medication is of considerble value not only in the inflammatory affections of the genito-urinary tract, but in the preparation of the patient for operation upon those organs and in the after-treatment.

OTOLOGY.

UNDER THE CHARGE OF

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Ear Disease in Influenza.

Professors Gruber and Politzer, of Vienna, gave a short synopsis of their experience in ear affections during the recent epidemic of influenza, at a meeting of K. K. Gesellschaft der Aerzte, February 28, 1890 (*Präger med. Wochenschrift*, March 12, 1890). Professor Gruber stated that in the third week in December, 1889, numerous cases of middle-ear disease, of a purulent nature, presented themselves, both in the clinic and in private. These were of a severe type, and resembled the form usually found in connection with an infectious disease like scarlatina or pneumonia. Statistics for December, 1888, and January, 1889, showed that ninety-one cases of otitis media catarrhalis, and ninety-five cases of otitis media purulenta presented themselves to his attention, while in the same period of 1889 and 1890, *two hundred and fifty-three* cases of otitis media catarrhalis, and *two hundred and eighty-nine* of otitis media purulenta came under his notice. These cases were of the most intense form and ambilateral, which is unusual in purulent processes. The process was characterized by extraordinary hyperæmia, which extended to the neighboring osseous and soft tissues. The membrana tympani was more frequently than usual implicated from the beginning, and soon showed extravasation of blood in its tissue, and ecchymoses also appeared on the wall of the auditory canal near the membrana tympani. The discharge from the drum-cavity was also more or less hemorrhagic at first, but subsequently become copiously purulent. In six instances artificial perforation of the mastoid became necessary. The mastoid cells were found filled with pus,

the bony structure broken down, and the pus cavity sometimes filled with granulations. In two cases burrowing abscesses formed. These grave symptoms ensued though the cases were treated carefully from the outset.

Professor Politzer limited his remarks to those cases in which the results of the influenza were suppuration of the middle ear, perforation of the membrana tympani, and abscess in the mastoid. In eighteen cases of abscess in the mastoid, ten cases were undoubtedly due to influenza-otitis. Typical symptoms occurred as follows: copious blennorrhœic discharge, swelling of the external auditory canal and surrounding parts, tenderness and swelling of the mastoid, and in most cases fever. These cases did not yield to antiphlogistic treatment, as apparently similar cases in other years had done. The pus cavity was found at a depth of ¼ to ½ cm. filled with granulations, or with greatly congested and rough mucous membrane, which easily bled when touched. These cavities were generally isolated, communicating only twice with the antrum mastoideum. In the ten cases operated on the discharge ceased in three or four days after the operation and the opening closed. In one case an abscess formed in the occipital region. In another case, affected with chronic Bright's disease, there was a fatal termination, post-mortem examination revealing extensive meningitis.

Forms of Otitis following Grippe.

Under this title Dr. Hermet presents his experience in ear diseases following the recent epidemic of influenza (*Gazette hebdomadaire de Méd. et Chirurgie*, March 8, 1890). He is of the opinion that the otitis of influenza differs from the ordinary type of inflammation of the middle ear. Its course is abnormal, its intensity greater, and serious complications more numerous. Examination of the ear reveals redness and swelling of the external auditory canal, and hyperæmia of the membrana tympani, with disappearance of its normal contours. In one case observed by Hermet, in a child, in which he was preparing to perform paracentesis of the membrane, vomiting on the part of the little patient ruptured the membrana. A bloody discharge from the drum cavity at once followed, coming out through the auditory canal, and a purulent discharge came into the mouth from the middle ear through the Eustachian tube. The pain continued unabated for three days after the spontaneous rupture of the membrana tympani. The discharge continued with great copiousness for two weeks, a feature noted in other cases of otitis media following grippe. Inoculations of the matter in these cases, performed on guinea-pigs, proved negative in result.

Aural Reflexes Caused by a Collection of Cerumen in the External Auditory Canal.

The reflex disturbances noted in this case existed for several months, and consisted of pain, palpitations of the heart, twitchings in the head and nucha, and vertigo. They disappeared promptly and entirely by the extraction of a plug of cerumen from the ear, which was accidentally discovered in the ear. It had not interfered in any way with the hearing.—I. Herzog, *Monatsschrift für Ohrenheilkunde*, May, 1889.

Exostosis in the External Auditory Canal.

Dr. Robert Barclay, of St. Louis, has given an account of an exostosis in the left auditory canal of a man, twenty-five years old, which acted as an obstruction to the outflow of pus from a chronic otitis media (*St. Louis Med. and Surg. Journal*, February, 1890). "The obstructing body was extremely hard, immovable, covered with a thin, glistening, pearly membrane, but not hyperæsthetic." As the tumor was increasing in size, a prognosis of a very unfavorable nature was given should further increase in the size of the exostosis cut off the escape of pus from the middle ear. It was proposed to remove the bony growth by means of a burr or reamer, run by the dental lathe. This was acceded to, and after the administration of chloroform, the canal was illuminated by lamplight. A long narrow burr, or reamer, tapering to a four-sided pyramidal point, $\frac{1}{12}$d of an inch in diameter, devised by Dr. Barclay, was adjusted to the handpiece of the surgical engine (S. S. White). The reamer was then directed from the middle point of the external groove above the exostosis inward and slightly downward until it was felt to emerge on the other side of the tumor. It was then pressed broadside, first backward and then forward, until the neck of the tumor was divided, when the tumor was removed with the foreign-body hooked curette. The base of the tumor was then stroked with the broadside of the reamer, from side to side, parallel to the surface of the normal canal wall, as closely to it as the soft tissues would permit. Syringing with hot water checked the hemorrhage. There were no bad sequelæ. The after-treatment consisted in cleansing with a solution of bichloride of mercury or with peroxide of hydrogen, followed by insufflations of boric acid. A complete cure was effected in one month.

Caries and Extraction of the Anvil; Etiology and Treatment of Chronic Suppuration of the Middle Ear.

The frequency of caries of the anvil and the necessity of the extraction of this ossicle in certain cases of chronic suppuration of the middle ear, are the subjects of the article with the above title, by Dr. Ludewig, of Halle. (*Archiv f. Ohrenheilkunde*, vol. xxix., March, 1890.)

The diagnosis of caries of the malleus, and the excision of the same, are comparatively easy. But the suppuration of the middle ear often continues after the diseased malleus is removed, though no other carious spot can be either felt or seen, in the tympanic cavity. "The anvil is, as a rule, not detectable by the eye or probe," and hence its disease not to be diagnosed with certainty; and yet not unfrequently disease of this bone is the only cause of continued suppuration in the ear. As the anvil has no further functional importance after the excision of the malleus, and as very often, after excision of the malleus, the anvil is syringed out in the after-treatment, Ludewig, as Sexton, of New York, has done for years, always removes the anvil, if present, after extraction of the malleus. All of Ludewig's operations, by the way, were performed last summer (1889), and as he appears to imply priority in this modification of the operation of excision of the ossicula auditus, he must be unaware that in this country Sexton has done it for years, and published accounts of his work (*Transactions American Otological Society*

for 1886, p. 521; also Sexton *On the Ear*, p. 374). Dr. Ludewig publishes now accounts of thirty-two cases, nine of which are from the private practice of Schwartze. He also describes a special form of hook ("anvil hook") for removal of the anvil, which is not equal in any way to that of Sexton, already described elsewhere as early as 1886.

The results of the operation of hammer-anvil extraction in the thirty-two cases are as follows:

Suppuration cured in	20 instances.
With regeneration of the membrana tympani .	5 times.
Without " " " " .	15 "
Still under treatment	11 cases.

One patient died of meningitis and pyæmia from long-continued caries and cholesteatoma of the middle ear, and not as the result of the operation. The effect on the hearing was varied. In two cases it appears to have been made worse; in ten cases it was unaltered; in the remainder, *i. e.*, in twenty cases, it was improved, *e. g.*, in one case from fifteen centimetres to two or three metres, and in another from five centimetres to one metre. The tests were whispered numerals applied both before and after the operation.

In two instances facial paralysis followed the endeavors to extract the incus, or its remnant, from the attic by means of the attic hook. In the first instance recovery took place in the course of seven weeks; but in the second case the paralysis had not disappeared six months after its occurrence. It would seem from our experience with this operation that too much force was exercised in the application of the hook to the attic cavity.

Otitis Externa Hæmorrhagica.

Dr. Gorham Bacon, of New York, reports five cases of this disease, the only ones observed in two thousand five hundred aural patients. His conclusions are as follows:

"1. Otitis externa hæmorrhagica is a rare form of disease.

"2. It should be considered a disease *per se*, an inflammation of the external auditory canal.

"3. It occurs more frequently among the young, although it may be found in the case of those advanced in years.

"4. Males are more frequently affected than females. The left meatus is more frequently involved than the right. The pain is usually not severe.

"5. The vesicles are usually found on the inferior wall of the bony auditory canal, although they may be situated on the anterior or posterior walls, and even extend to the drum-head." (*Archives of Otology*, vol. xix., Jan. 1890.)

Such a condition of the external auditory canal and drum-head was seen, even in both ears, in numerous cases of influenza otitis media in the recent pandemic, as observed and reported by Haug, of Munich, and others.

OBSTETRICS.

UNDER THE CHARGE OF

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Pregnancy with Congenital Closure of the Vulva.

Heyder (*Archiv für Gynäkologie*, Band xxxvi. Heft 3) reports the case of a patient aged twenty-two years, brought into the hospital six months advanced in pregnancy, with the history of having fallen and caused hemorrhage and pain; upon examination almost complete closure of the vagina and vulva was found by a membrane forming a blind sac; upon closer examination a very small opening was discerned under the symphysis. The history of the patient was that when three years old she was run over by a wagon, and so injured as to create two scars, one on the left side of the abdomen beneath the ribs, the other on the left side of the vulva. She could give no other cause for this deformity. Menstruation had been regular. On closer examination a double membrane was found enclosing a space between into which a small opening could be discovered. As labor was impossible without some operation, a sound was passed through the opening, the membrane removed by thermo-cautery, the edges trimmed with scissors, and the wound in the vagina was closed with fine silk; the patient went through a normal pregnancy, and was delivered by normal labor.

The case is one of congenital malformation, and cannot be ascribed to the accident which the patient narrated in her history.

The Use of Chloroform during Labor.

At a recent meeting of the Obstetrical Society of Paris (*Bulletins et Mémoires de la Société Obstétricale et Gynécologique de Paris*, No. 1, 1890) Porak advocated the use of chloroform during labor, stating that he had prolonged its use at intervals during six, eight, ten, and even twelve hours. He gives it by a mask which allows but little chloroform to escape into the atmosphere; he has employed from one and a half to four ounces of chloroform at one labor; examination of the fœtus has exhibited traces of chloroform shortly after labor, proving that the vapor passes easily from mother to child. Porak considers it the best and least dangerous anæsthetic for labor, and has never seen ill results following its use; he endeavors not to give it before the period of dilatation is complete; in discussion, Pajot and Budin agreed also in recommending chloroform.

Surgical Treatment of Impacted Labor.

Lawson Tait (*British Medical Journal*, March 22, 1890) describes his method of amputating the uterus in impacted labor. There are necessary for this operation two or three pairs of catch forceps for arresting bleeding

points; a small sharp scalpel; two or three bayonet-pointed suture needles, some silk, a piece of India rubber drainage-tube, and two steel knitting needles. The first step in the operation is an abdominal incision four inches long through first the skin and then the muscles down to the rectus; then the tendon of one or the other of the recti is opened, the muscular tendons fall aside, the posterior sheath of the tendons is taken up by two pairs of forceps; the extra-peritoneal fat is drawn up similarly, then the peritoneum raised again by two pairs of forceps, and a slight notch made between them; the finger is then introduced into the peritoneal cavity, and the relation of the uterus and bladder exactly ascertained; the peritoneum is opened to the full extent of the incision, the drainage-tube about eight inches long is held as a loop between the fourth and middle fingers of the left hand, slipped over the uterus and pulled down over the cervix; a hitch is then made in the tube as low as possible, and is pulled tight; a second hitch may be made which had better be given to an assistant; a small hole is then made in the uterus, the finger inserted, the position of the placenta ascertained, if possible; if not, the aperture is enlarged, the leg of the child is seized, and the child delivered feet first; the placenta is then sought for and removed, the uterus pulled down out of the wound, the elastic ligature tightened, and tied about the cervix; the knitting needles are passed through the flattened tube and through the uterus, forming a cross by two parallel bars to support the weight of the uterus and the stump, and to keep it outside of the wound; the peritoneum and the wound are closed down to the stump, as usual. The uterus is now removed close down to the needles and rubber tube, leaving a little tissue above; perchloride of iron is rubbed gently over the stump and the uterus is dressed with dry lint and gauze, an ordinary obstetric binder is put on, and the operation is finished.

Tait claims that this operation is better than Cæsarean section, and urges it in all cases where the mother's life is placed in danger.

Repeated Application of the Forceps to Effect Rotation.

Loviot (*Bulletins et Mémoires de la Société Obstétricale et Gynécologique de Paris*, No. 11, 1889) reports the case of a multipara in whom the occiput was turned posteriorly, and in whom uterine contractions were not sufficient to rotate it forward; under the influence of repeated application of the forceps, a living child was easily delivered. He also reports the case of a primipara in whom the head rotated with the occiput posterior; attempts were made to turn the head anteriorly by the hand, but failed; the head was delivered by forceps, the child having died; at the time of delivery it was found that the shoulders of the child had not rotated, but remained as if in an occipito-anterior position.

Breech Presentation in Contracted Pelvis in a Primipara. Cephalic Version, Extraction of a Living Child by Forceps.

Loviot (*Bull. et Mém. de la Soc. Obstét. de Paris*, No. 11, 1889) describes the case of a primipara in whom breech presentation occurred at between eight and nine months pregnancy; the fœtus was gently pushed up in the uterus,

the patient being chloroformed, a cephalic version was made, the membranes were ruptured, and the head extracted with the forceps, the child being born alive.

He also adds the report of a case of right dorso-posterior position, in which rapid version was made, the parturient lying upon the right side; the patient was partly anæsthetized; the rapid extraction of the child was comparatively easy. Loviot regards the lateral position of the patient as most advantageous in such version.

Practical Points regarding Cæsarean Section.

Sänger (*Centralblatt für Gynäkologie*, No. 12, 1890) writes concerning the essential points in the modern Cæsarean section as improved by him. He regards the simplifying of the operation as of great importance. As a means of checking hemorrhage the careful suture of the uterus is of paramount importance; he regards the method of checking uterine hemorrhage which results from atony of the uterus by means of tampons of iodoform gauze as especially valuable, and raises the question whether it would not be proper to tampon the uterus with gauze at all Cæsarean sections before closing the uterus; he thinks that this precaution would render the cases where amputation of the uterus for hemorrhage is necessary much less frequent; in severe cases he would even have recourse to artificial inversion and extirpation of the uterus through the vagina. Regarding hemorrhage from the placenta, he much prefers to deal with the placenta when situated at the anterior uterine wall, as uterine incision anteriorly is less likely to be followed by adhesions and subsequent complications. At the moment of operation he considers pressure by the hands of a skilful assistant the best possible means of checking hemorrhage; it is difficult, however, to keep up pressure sufficiently long, and with sufficient vigor in all cases; he accordingly suggests the use of a piece of antiseptic muslin, shaped like a cravat, which he places about the lower uterine segment, crossed at one side, and then held firmly by the hand. A number of these cravats may be used about the edges of the abdominal wound, and can be held in place by hæmostatic forceps. He regards entire separation of the placenta and the free use of ergotin by injection as useful means of lessening hemorrhage, and especially cautions against operating before labor pains are well established, as the uterus does not contract properly in such cases, and uncontrollable hemorrhage is very apt to occur.

Regarding the antisepsis of the operation, his main reliance has been absolute cleanliness and the application of heat in cleansing the instruments and apparatus; antiseptics are useful externally, but should never be brought in contact with the peritoneum; iodoform is still employed to dust the uterine wound, not so much as an antiseptic as an agent lessening the formation of ptomaines.

It is his custom to seal the abdominal wound tightly by means of adhesive plaster.

Sänger concludes his observations (*Ibid.*, No. 13, 1890) by some considerations regarding the suture to be employed in Cæsarean section. He reasons that the tissues to be closed are composed of different varieties, and that it is

irrational to close them together by only one suture; he believes that the uterine muscle should be closed separately, and then the peritoneum drawn over. He considers silk the safest and most convenient material for suture, and regards the adhesions which frequently take place between the uterus and anterior abdominal wall to be dependent upon a lack of precaution which irritates the peritoneum through the application of antiseptics, too large knots in the suture employed by which the uterine wall is closed, and also a failure to close the peritoneum accurately, which leads to imperfect closing of the abdominal wall and the formation of adhesions: he would avoid this trouble by perfect asepsis instead of the use of antiseptics, and by a most scrupulously careful closure of the peritoneum separately.

The Simplification of the Method of Performing Cæsarean Section.

Leopold (*Archiv für Gynäkologie*, Band xxxvi. Heft 3) would simplify Cæsarean section as much as possible, believing that it is not necessary to avoid decidua in inserting the stitches; while holding that the serous suture is important, he does not believe that the serous suture is a safe preventative of hemorrhage, as in one of his cases fatal hemorrhage occurred through the tissues between two deep stitches over which serous stitches had been placed; he believes that an incision three and one-eighth inches long is generally sufficient, which can be closed by five or six deep and six or eight superficial sutures, the latter of which he would insert one-third of an inch deep.

In reply to Leopold, Fritsch writes (*Centralblatt für Gynäkologie*, No. 13, 1890) denying that so small an incision as that recommended by Leopold is possible, reasoning that a child's head of a circumference of nearly eleven inches cannot be delivered through such an incision; he also claims that the serous suture is a most efficient preventer of hemorrhage, and he instances cases of his own where such has been the case.

A Contribution to the Study of Placental Adhesion.

Cohnstein (*Archiv für Gynäkologie*, Band xxxvi. Heft 3) has investigated the frequency of adherent placenta and operations necessary for its removal. He finds that obstetric operations for abortion, miscarriage, atony of the uterus, and stricture of the uterus, and other complications with the placenta, except adhesions, average $2\frac{1}{10}$ per cent. of all cases, while adherent placenta is a cause for operation in 0.46 of one per cent., while in polyclinic practice in 4.35 per cent. The safest way of diagnosticating placental adhesion during the placental stage in labor consists in introducing the entire hand for examination; adherence is generally found at the fundus and anterior surface of the uterus; the most frequent cause of placental adhesion is inflammation of the endometrium caused by premature births, rapidly repeated pregnancies, infectious diseases, syphilis, and nephritis; placenta prævia also frequently results from adherent placenta; the best prophylactic treatment of adherent placenta is the prevention of chronic endometritis.

Some information can be obtained regarding the existence of adherent placenta by observing the degree of distention or the fluctuation wave existing in the vessels of the umbilical cord after it has been sutured and cut.

The Action of Antipyrin upon the Uterus during Labor and the Puerperal State.

Pinzani, in an Italian pamphlet with the above title, describes a series of experiments upon patients with antipyrin during labor and the puerperal state; in therapeutic doses antipyrin depresses the contraction and retraction of the uterus; its effect commences half an hour after administration by the mouth, and attains its maximum during the two or three hours following; when given hypodermatically it acts in from half an hour to an hour and a half with maximum effect. Its action upon the uterus is felt soonest when administered early in labor in considerable doses; antipyrin diminishes the contractions of the uterus during the puerperal state, and also the pains caused by its contraction, whether in the puerperal state or during labor.

GYNECOLOGY.

UNDER THE CHARGE OF

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The Influence of "La Grippe" upon the Female Sexual Organs.

R. Müller (*Centralblatt für Gynäkologie*, April 26, 1890) has made some interesting observations in this direction, his deductions being as follows: Out of forty-eight patients, forty-six showed positive evidences of uterine disturbance during an attack of influenza. The most prominent symptom was metrorrhagia, which resisted the ordinary means of treatment. On examination the uterus was found to be congested and tender to the touch. Patients with existing pelvic troubles invariably became worse.

Elevation of the Pelvis, according to Trendelenberg's Method, during Gynecological Operations.

Trendelenberg (*Sammlung klin. Vorträge*, No. 355) describes his method of performing vaginal hysterectomy while the pelvis of the patient is elevated by an assistant supporting her knees over his shoulders, according to the method which he adopts when performing supra-pubic cystotomy. Vesico-vaginal fistulæ which are inaccessible with the patient in the ordinary position can be readily reached when she is in this posture.

Infection through Catgut.

Braunner (*Beiträge zür Chirurgie*, Bd. vi. Heft 1) has found by experimenting with catgut prepared in various ways that the sublimated is always permanently sterile. About one-half of the specimens of chromocized, car-

bolized, and juniper-oil gut contain bacteria, though the latter do not seem to possess infectious properties. Gut was removed from an animal that had died of splenic fever and was introduced into the bodies of healthy animals, which speedily succumbed to the same disease; but when the raw gut was prepared with corrosive sublimate or carbolized oil it remained sterile. The following directions are given for preparing the catgut: The raw gut is scrubbed with alkaline soap, is immersed for a quarter of an hour in ether, then for twelve hours in a one to one thousand sublimate solution. It is preserved in a solution consisting of one part of corrosive sublimate, nine hundred parts of absolute alcohol, and one hundred parts of glycerin. Immediately before being used it should be dipped in the watery solution above mentioned.

Complete Procidentia in a Newborn Infant.

Quisling (*Norsk Mag. for Lägend.: Centralblatt für Gynäkologie*, April 26, 1890) reports the case of an infant seven days old who was attacked with diarrhœa accompanied by severe straining, which caused prolapse of the rectum and vagina. On the following day the uterus appeared at the vulva and became completely procident. It was easily replaced, but at once prolapsed and remained thus until the death of the child, which occurred six weeks later. As the autopsy showed no abnormality of the pelvic organs, the displacement must have been due purely to the excessive abdominal pressure. This case, the writer observes, throws some light on the etiology and treatment of prolapsus.

Apostoli's Method.

Satonski (*Medicinische Rundschau*, 1889, No. 11) has met with the following results in thirty cases: In hydro- and hæmato-salpinx a current of 150 to 180 milliampères gave brilliant results, in pyosalpinx none whatever. In chronic oöphoritis a current of 160 to 220 milliampères caused reduction in the size of the diseased ovary and relief of the pain. 280 milliampères was the highest dosage employed in chronic metritis, under which the uterus became smaller and the pains were diminished. In amenorrhœa there were no results; in parametritis improvement. Though no definite results are given in the case of fibroids, it is stated that electricity should always be tried before advising an operation.

Displacement of the Spleen into the Pelvis.

Klein (*Münchener med. Wochenschrift*, 1889, No. 44) reports an autopsy in the case of a woman, æt. sixty-three, at which the enlarged spleen was found lying in the vesico-uterine pouch, the uterus being retroverted. A band the size of the thumb extended between the spleen and the greater curvature of the stomach. The liver, stomach, and transverse colon were also displaced downward. An ante-version pessary was found in the vagina supporting the spleen, so that the latter must have been mistaken for the fundus uteri—an error which occurred in a similar case reported by Dietl and Rezek.

Ventro-fixation of the Uterus.

Spaeth (*Deutsche med. Wochenschrift*, 1889, No. 37) reports fifteen cases in which this operation was performed by Prochownik, after palliative treatment had been long tried without results. Most of the various methods were employed. In all but one case the fundus uteri was found to be adherent to the anterior abdominal wall at the end of four weeks. Several of the patients had been under observation for months or years, and the result had been quite satisfactory. The adnexa were removed in all but five cases. Conception did not occur in a single instance.

Praeger (*Centralblatt für Gynäkologie*, April 19, 1890) reports four cases, one of which terminated fatally. Instead of using a pessary to support the uterus, after suspending the organ according to Sänger's method, he introduces an additional catgut suture through the fundus in order to relieve the traction on the other sutures while the patient lies upon her back. He believes with Dembowski that Leopold's method of freshening a surface on the anterior aspect of the fundus and bringing it in contact with the parietal peritoneum does not insure the formation of a firm adhesion; touching the peritoneum with the thermo-cautery would be a more efficient means. Catgut should not be used as a fixation-suture, as Czerny and Veit have advised. But no single method is applicable to every case, since it is sometimes impossible to draw the uterus up sufficiently to practise ventro-fixation; the organ must then be suspended, as Kelly has advised.

Extirpation of the Kidney in a Child Three Years of Age.

Dohrn (*Centralblatt für Gynäkologie*, April 19, 1890) reports a successful case of laparotomy for the removal of a large round-celled sarcoma of the kidney in a child. The patient was discharged four weeks after the operation and was perfectly well at the end of two months. Twenty-nine cases have been reported, with a mortality of 44.9 per cent. following the operation.

The Treatment of Cicatricial Stenosis of the Vagina.

Küstner (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xviii. Heft 2) calls attention to the fact that incision and stretching of cicatricial bands in the vagina are only curative in the less severe cases. Where there has been extensive loss of tissue, as the result of sloughing, a regular plastic operation must be performed. Credé recommended the taking of a flap from the labium majus, notwithstanding the fact that true skin is included in the vaginal wound. The writer describes a case of extreme stenosis of the vagina in which he excised the cicatricial tissue, and turned into the wound bits of mucous membrane taken from a freshly excised piece of human small intestine, which were sutured to the edge of the wound. These retained their vitality and united satisfactorily. Two flaps were subsequently added from the adjacent posterior vaginal wall. Though the vagina was still contracted, the cicatrix resulting from the plastic operations was more elastic than the old one, so that after another flap had been turned in, the vagina was so widened and deepened that coïtus was possible. The writer advises the transplanta-

tion of a piece of fresh intestinal mucous membrane removed from some animal as a preliminary step after excising an extensive vaginal cicatrix, any subsequent defect being supplied by a flap taken from the adjacent vaginal wall.

The Treatment of Cervical Catarrh.

Stratz (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xvii. Heft 2) reports the comparative results obtained by employing different methods of treatment in successive series of twenty-five cases. In the first series daily applications of a ten per cent. solution of chloride of zinc were used, the average number of applications being eighty. After the lapse of five months ten patients were not cured, and the other fifteen had a recurrence of the trouble within two or three months. In the second series a fifty per cent. solution of chloride of zinc was applied, the average number of applications in sixty days being twelve. Three patients were treated for six months without benefit; six were cured, and all the rest had a recurrence after a couple of months. Syphilitic patients responded promptly to the treatment. In neither series was there any unfavorable symptom.

The third series included many of the cases which had been treated unsuccessfully with the chloride of zinc applications. In every instance excision of the diseased mucous membrane, according to Schröder's method, was followed by a cure.

The fourth series were treated by applications of concentrated lactic acid, about ten being made in the course of fifty days. Ten patients were cured, two were not benefited, and the rest had a recurrence.

In conclusion the writer infers that the weak chloride of zinc solution is comparatively useless, the stronger solution and lactic acid give fair results, but that excision offers the only sure prospect of permanent cure in obstinate cases of chronic cervical catarrh.

Vesical Complications in Connection with Pelvic Affections.

Lindemann (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xxii. Heft 2) contributes an elaborate paper on this subject, its purpose being to call attention to the changes in the shape, size, and condition of the bladder occasioned by pelvic inflammatory processes and new-growths, and the importance of these changes in connection with surgical operations. In an introductory section on the normal anatomy of the bladder directions are given for estimating the size and relations of the viscus by introducing a catheter, and turning its point in various directions, so that it may be felt by the finger within the vagina. The vesical disturbances which accompany peri- and parametritis are only marked when the peri-vesical connective tissue is itself affected; the pressure of pelvic exudates alone is not usually sufficient to produce them. Traction upon the viscus by false bands causes vesical irritability, but the pressure of indurations upon the nerves supplying the bladder doubtless accounts for some of the symptoms. Neoplasms within the pelvis affect the bladder in two ways—by direct pressure, and by causing upward traction upon the cervix and vagina. The shape and relations of the organ are often greatly changed in consequence. In cancer of the cervix the bladder wall is early

involved, so that in a case which seems otherwise most favorable for vaginal hysterectomy, a radical operation is contra-indicated.

Sterility.

Lier and Ascher (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xvii. Heft 2) have made an exhaustive study of this subject, based upon upward of two hundred cases, selected from among 2500 married women under forty years of age, none of whom had been married less than a year and a half. 76 of the 227 applied on account of sterility. In 29 the apparent cause was slight (usually stenosis, a displacement, or simple cervical catarrh), in 31 there was either some congenital defect, gonorrhœa, or neoplasms. 46 husbands were examined, 21 of whom suffered from azoöspermia, 6 were practically impotent, and 5 had infected their wives with gonorrhœa soon after marriage; in other words, in seventy per cent. of the cases the male was unquestionably to blame. 151 sterile women applied for treatment on account of pelvic trouble, 79 of whom were suffering from some form of gonorrhœal infection. 86 husbands were examined, 21 of whom had azoöspermia. Of the 60 men who were healthy at the time of examination, 34 had wives whom they had infected soon after marriage.

A summary of the two series shows that of the 227 cases of sterility, 132 (58.1 per cent.) were directly due to the male. Among 424 cases collected from other sources, 169 (40 per cent.) were to be ascribed to either azoöspermia or gonorrhœal infection. As Sänger has pointed out, the importance of gonorrhœa in its bearing upon vital statistics is emphasized by the foregoing observation, and its remote dangers cannot be overestimated.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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The Influenza.

From a public health point of view, the most important event in the medical history of the past year was undoubtedly the epidemic of influenza, which, entering Europe from the East early in October, had in the course of the next three months spread over every part of the Continent; whence, crossing the Atlantic and the Mediterranean, it reached Canada and the United States early in January, Northern Africa, Syria, and Persia somewhat later, and, finally, invaded the Cape and India in February, and the Australasian colonies and settlements in March.

The path of the epidemic in Europe and beyond it, shows conclusively that, like cholera, it followed the lines of human intercourse, and that consequently, whatever its original source, and the apparent capriciousness of its

incidence, it belongs to the class of contagia, and is not caused or carried by atmospheric or other meteorological conditions. Its course within the Continent of Europe was from east to west—*i. e.*, opposed to the direction of the prevailing winds at that season, but was modified or diverted by such physical obstacles as mountain ranges and the interposition of seas. Thus, while it took nearly six weeks to extend itself over Russia, its progress was much more rapid so soon as it reached Central and Western Europe, with their networks of railways and other facilities for intercommunication. In the first ten days of December it had spread over Poland, Germany, Austria, Sweden, and Denmark, in the next the Netherlands and France, and in the last Spain, Italy, England, the Balkan States, and, finally, Norway. It evidently did not reach the last-named country from Sweden, its course having been checked by the intervening mountains, but by means of communication with Denmark or with England. The Alps and the Carpathians, in like manner, delayed its progress, and in case of the Danubian countries, this diversion amounted to an actual reversal of its direction. From Italy and the Levant it continued its now easterly course through Egypt to Syria, Persia, and India, and thus while its first appearance in the eastern hemisphere was in Northern Asia, its last was in the south of the same Continent, there being absolutely no direct communication between Siberia and India. To America, the Cape, and Australia it was clearly carried by the great liners; but it has recently been elicited by a letter from the agents of the Church Missionary Society in British North America, that influenza was prevalent around the shores of Hudson Bay and in Saskatchewan as long ago as last May; if so, and if it passed thence to Siberia, it would seem to have performed a complete circuit of the globe on its reaching Canada and the States in January of the present year.

Again, were it carried by winds, the inhabitants of town and country would be equally and simultaneously affected by it in its march, whereas, we find that the large centres of population and commerce are the first to suffer, next the smaller towns, and the rural and isolated communities last, if at all. In towns men suffer more than women, and those who are most aggregated under the same roof—as soldiers, and clerks in the general post-offices and banks, workmen in factories, printing houses, and large places of business, are attacked, in the first instance, in greater numbers and more simultaneously than the general public; while in the country, farmers and others who congregate on market days suffer far more heavily than the shopkeeping class.

The number of deaths certified as due to influenza would give an utterly erroneous and inadequate estimate of the mortality caused directly or indirectly by this disease. In an important and interesting communication by Dr. Jacques Bertillon, Chief of the Statistical Department of the Municipality of Paris, which he read before the Epidemiological Society of London, this was well shown. While the deaths returned as influenza were but 213, the general mortality of that city during December and January was in excess of the average by no less than 5500, an excess which could not be accounted for by any conditions of weather or any unusual prevalence of other epidemics. The deaths from pneumonia, bronchitis, and pleurisy were double the average, and an almost equal increase was observed in those from phthisis, organic lesions of the heart, diabetes, chronic diseases of the kidneys, etc.

The former group, or those of the organs of respiration, represented, undoubtedly, the complications and sequelæ following on attacks of influenza in which medical advice had not been sought for the primary attack, and the latter was constituted by cases in which the supervention of influenza on chronic diseases, caused or accelerated a fatal termination which would otherwise have been deferred for months or years. A like excess of the mortality from all or nearly all causes was seen in every country, and especially in the larger cities.

Although the resultant mortality has been thus greatly constituted by diseases of the respiratory organs, the present epidemic has been distinguished from previous ones, especially the last, in 1847, by the general absence or mildness of the catarrhal symptoms in the initial stage of the primary disease, which has in the majority of cases been of the "nervous" type, except in Russia, where the proportion of pulmonary or abdominal catarrhal forms has been larger than here or in other countries. WILTSCHUR, of Petersburg, observed that the number of consumptive patients attending the Obuchow Hospital was greatly increased during the epidemic, and that the supervention of influenza on phthisis materially modified the type of the primary disease. The patients were, for the most part, still well nourished. Cyanosis of the face and extremities was of frequent occurrence, with asthma, extreme weakness, high temperatures (40.5° to 41° C. = 104.9° to 105.8° F.), pulmonary hemorrhages and rapid progress of the lung disease, death occurring in many instances unexpectedly and suddenly, apparently from implication of the cardiac ganglia. Persons, too, who had not previously shown any signs of pulmonary weakness, not uncommonly developed, after an attack of influenza, tuberculosis of the most acute form—"galloping consumption."

All attempts to discover a specific or characteristic microbe of influenza have as yet been unsuccessful. The most expert bacteriologist and trustworthy observers, as Finkler, Klebs, Ribbert, Weichselbaum, etc., have constantly found the diplococcus pneumoniæ, streptococcus pyogenes, and the staphylococcus aureus, all of which are common to every form of catarrhal and inflammatory disturbance of the respiratory organs.

MILK PRESERVATIVES.

Milk is obviously the most perishable article of food, and between the alternatives of finding himself run out before the evening, or having at closing a quantity of useless milk on his hands, the retail dealer's position is not an enviable one. He cannot, like the large dairy companies, always keeping a supply in excess of any possible demand, put each night's surplus through the separator, to provide the daily turnout of fresh butter, and dispose of the separated and still sweet "skim" milk early next morning to confectioners and bakers. One cannot, therefore, blame him if he yield to the temptations of unscrupulous speculators, whose advertisements appear in surprising numbers in the pages of the trade journals, and by means of "preservatives," endeavor, more or less successfully, to keep his surplus sweet till the next day, when he may either dispose of it to less fastidious customers, or add it to the general bulk—a dangerous practice from every point of view.

These preservatives cannot be composed of more than a very few sub-

stances, since they must fulfil the conditions of a practical absence of taste, color, odor, and poisonous properties. In fact, soda, bicarbonate of soda, lime, borax, boric acid, and salicylic acid exhaust the list of possible constituents.

Before putrefaction, common to all animal fluids, sets in, milk undergoes two characteristic changes, viz.: souring and curdling; the former, or the conversion of the milk sugar into lactic acid, is set up by the action of fungoid organisms, while the latter, or coagulation of the casein, is brought about mainly by the action of the acid, but also by that of some product of bacterial formation of the nature of rennet.

Souring and curdling are sensible indications of change, but changes of far graver character may go on in their absence, even as in the production of tyrotoxine without perceptible alteration of taste. The alkalies act by neutralizing the lactic acid as fast as it is formed, thus obviating the sour taste and delaying coagulation, but have no germicidal or antiseptic powers. Salicylic and boric acid are well known antiseptics, that is in sufficient concentration, while borax is supposed to combine the properties of both. That they are largely used, and would be more often detected if looked for, there can be no doubt; but, setting aside the question of their wholesomeness or effect on health in the small quantities in which they can be used, DRS. LAZARUS and BITTER, of the Hygienic Institute at Breslau, instituted a series of experiments to determine how far they fulfilled their ostensible purpose.[1] They experimented on sterilized and on raw milk, at high temperatures (95° F.), and at that of ordinarily hot weather (68°–72° F.), with bouillon cultures of several pathogenic microbes associated with gastro-intestinal disorders, including Koch's cholera bacillus, Emmerich's enteric bacillus, and the spirillum of Finkler and Prior, and observed the behavior of the ordinary saprophytes of milk alone or together with the pathogenic. The quantities of the several reagents employed were the maxima that could be added without giving a perceptible taste—or, of soda and its bicarbonate 3 grammes; of boric acid 1 to 2 grammes; of salicylic acid 0.75 gramme; of borax 4 grammes, and of lime 1.5 grammes. The flasks were kept at the ordinary temperature of excessively hot weather, when such preservatives would be most used, viz., 68° to 72° F., and the inoculations were made with the usual platinum hollowed needle, but occasionally heavier sowings and higher temperatures (95° F.) were employed. The procedures and precautions observed were such as are familiar to all bacteriologists, the sterilization being effected by exposing the tubes to steam for two or three hours, and the unsterilized milk being drawn direct from the previously cleansed udder into sterilized vessels and used as soon as possible. In every case gelatin cultures were made from the milk tubes at three, six, nine, twelve, and twenty-four hours after they had been prepared and placed in the thermostat, the results both as to the kind and number of the bacteria developed in the gelatin being evident on the second day.

The pathogenic microbes grew well in the sterilized milk, and set up acidity which did not appear in the control samples. Finkler-Prior's was most active in this respect, causing the milk to coagulate in twenty-four to forty-eight hours according to the temperature. In the case of the cholera bacillus this

[1] Zeitsch. f. Hyg., Bd. viii. p. 2, 1890.

acidity soon arrested the further development and ultimately caused the extinction of the microbes.

In non-sterilized milk this destruction of Koch's bacillus was very rapid, the natural souring aiding that produced by the microbe; and with the bacillus of enteric, though acidity played a part as shown by control experiments, the growth of saprophytes was the efficient cause of the extermination of the pathogenic microbe within two or three days.

The general results as to the effect of so-called preservatives were somewhat surprising. With soda, or its bicarbonate, though souring was delayed, coagulation was not, for the alkalies, so far from acting as germicides, favored the development of microbes, and the excessive formation of their "rennet-like" products compensated for the removal of the acid by fixation. The sole action of soda is, therefore, the neutralization of the lactic acid, and thereby the concealment, by withdrawing one evidence, though the earliest and most palpable, of the changes which go on unchecked if not actually intensified. Yet the extent to which it is used in Germany, and probably elsewhere, may be judged by the fact that it had been undoubtedy added in forty of sixty-four samples of milk examined by Dr. Lazarus in the intensely hot weather of the earlier half of August, 1888. Boric acid, though a valuable and non-irritating antiseptic in surgical practice, when employed in a concentrated solution, appeared in the proportions practicable in the milk trade to be illusory. Neither acidulation nor coagulation was delayed, and it was powerless alike against saprophytes and pathogenic microbes. These conclusions do not conflict with the late Prof. Barff's successes in preserving meat, fish, or even cream by means of "boroglyceride," for he used it in a concentrated form, and washed it out before serving up the articles of food thus preserved.

Borax and lime were equally useless, the latter acting like soda, the former perhaps a little better. Salicylic acid alone had any claim to be considered a preservative. It did not, when added to raw milk, delay acidulation much beyond the normal period, but coagulation was postponed for twenty-four to seventy-two hours. Its effect on saprophytes was very marked, gelatin cultures showing that at a temperature of 71.6° F. their development was checked from the beginning, and that in twenty-four hours they were extinct.

The cholera bacillus died out from sterilized milk in six to nine hours, and in raw milk even sooner; but since salicylic acid has little effect on the souring, it was not possible to say how much of this result was due to the salicylic and how much to the lactic acid; and with regard to the microbe most to be feared, that of enteric fever, the action of salicylic acid was unfortunately inappreciable. Dr. Lazarus having established its claim to be a preservative, discusses the question of how far its employment is justifiable. It has, indeed, been condemned in France, but entirely on theoretical grounds. No doubt its habitual use would be injurious, but that is precluded by its cost, and he comes to the conclusion that under exceptional circumstances, and when the milk cannot be boiled before any changes have set in, its employment might be really advantageous.

The readiest test for soda is that of Schmidt, and consists in the addition of a few drops of rosolic acid to a mixture of equal parts of milk and alcohol. If the milk be pure, the color produced will be a brownish-yellow; but if an alkali, alkaline earth, or a carbonate of either be present, the red color of the

reagent will be heightened from a rose to a crimson, according to the alkalinity of the solution. As little as 0.2 per cent. is easily detected, and the test is equally applicable to borax and lime. For boric acid there is no ready test, but salicylic acid betrays itself at once by striking a purple hue, like that of potassium permanganate, with a dilute solution of ferric chloride.

Sterilized Milk.

In boiling milk we have a certain means of destroying any pathogenic microbes, and if performed before putrefactive processes, including souring, have commenced, of delaying these for a time. But the question whether the chemical, or rather physical, changes effected by boiling have any influence on its digestibility, is an important one in its bearings on infant-feeding. Some medical men advise that milk should always be boiled as a precaution against infection, and with a view to keeping it longer sweet; others are under the impression that its digestibility is impaired. We believe that such fears are absolutely groundless, for heat alone does not coagulate the casein, which is the least digestible constituent: it throws up a film of coagulated serum-albumen, which entangles some of the fat globules, and, perhaps, a little of the casein, but beyond the alteration in the flavor, which we need not take into account with infants, the only other change is that the casein when brought into contact with the gastric secretion forms a finer and more flocculent curd—a decided advantage. This we believe to be the reason why the best Swiss condensed milk agrees so well with young infants, especially those with more feeble digestions, resembling in this respect physically, though not chemically, that of the human female, and more than compensating for the excess of sugar.

Milk sterilized by Soxhlet's process—*i. e.*, fresh milk poured into flasks, exposed to heat in a steam or water bath, and corked while in a state of ebullition—has been employed with the best results for infants; and Scherff's milk, in tins hermetically sealed while boiling, has found a ready sale on yachts and ocean steamers, but the cost precludes its general use apart from the drawback of the change in flavor. Pasteur proposed heating the milk to 140° or 176° F., and then cooling it down to 46.5° F., the higher temperature being fatal to most fermentive microbes, and the cooling intended to avoid the multiplication while the milk retained its warmth of any that might have escaped. Thiel's apparatus is the best for this purpose. It consists of a copper cylinder with corrugated sides, a draw-off pipe and cock at the bottom, and a cover above. This is enclosed in a sheet-iron cylinder, leaving an inter-space about five centimetres (two inches) wide, and the whole encased in wood to hinder the loss of heat. Steam from a boiler is turned on into the space between the copper and iron cylinders, and the temperature regulated as indicated by a thermometer. The milk is run down the inner corrugated surface of the copper in a thin film, as in the refrigerators in general use in this country, and conducted thence to a cooling apparatus constructed on the same plan. The volume of milk admitted can be controlled, but its downward flow cannot, of course, be retarded, and any desired prolongation of heating must be effected by retaining the milk in the apparatus.

Dr. Bitter experimented with 20 quarts of market milk at a time, varying the flow from a quart in 40 seconds to 100 seconds, and keeping the

temperature of the outflow at 158° or 167° F. The results were encouraging, in so far that the milk kept sweet at least thirty hours longer than samples of the same not so treated; but while a temperature of 167° F. did not wholly sterilize it, one of 158° F. altered the taste perceptibly, and consequently the process has not found favor with dairy farmers or dealers. Indeed, Dr. Bitter thinks that it would be an error to accustom the public to the boiled taste, as it would tend to open a door to other forms of falsification. Pasteurized milk kept twice as long when the churns or cans were also sterilized by steam. But while the complete sterilizing of milk on a large scale is obviously impracticable, the simple process of chilling it as soon as possible by means of a refrigerator, of which Lawrence's is the best, has a remarkable effect in delaying the souring. It is insisted on by all the large dairy companies in London, who obtain their supplies from the country at distances of one hundred miles, or even more. Such milk remains unchanged for at least twenty-four hours longer than that from even the best dairies round London which has not been chilled, and in which the early rising of the cream, the first indication of change, is commonly mistaken for greater richness. The agitation of milk run still warm into the churns, and transported from some distance by road or rail, is well known in the trade to cause rapid deterioration, but an extreme instance of this which occurred in America when all the residents in a hotel who partook of the evening "meal" suffered violent purging, vomiting, and even collapse, while those who had taken the morning's milk only did not, showed that other changes than that of souring may be thus set up. The milk in question had been conveyed eight miles along a rough road in the hottest hours of the day in an exceptionally hot season, and Professor Vaughan detected in it the alkaloid that he had originally discovered in some similarly poisonous cheese, and had consequently named tyrotoxine, supposing it to have been formed by some mould in the process of ripening.

NOTE TO CONTRIBUTORS.

My editorial connection with this Journal, which has extended over a period of more than twenty-one years, ceases with this issue. In taking leave of the contributors to its pages I desire to express to them one and all my deep appreciation of the value of their labors, which have so largely given to the Journal the reputation it enjoys, and my cordial thanks for the support they have with uniform kindness given me, which has greatly lightened my editorial task.

I. MINIS HAYS.

All communications intended for insertion in the Original Department of this Journal are only received with the distinct understanding that they are contributed *exclusively* to this Journal for publication. Gentlemen favoring us with their communications are considered to be bound in honor to a strict observance of this understanding.

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